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Ash Creek Associates, Inc.
Environmental and Geotechnical Consultants

Remedial Action Plan
Former Florida Smelting Company
FDEP Site # Com_293274, Project #315913
Jacksonville Annex I Bulk Terminal
Jacksonville, Florida

Prepared for:
NuStar Terminals Operations Partnership L.P.

December 29, 2011
1739-02

Kirsten White for

Chris Breemer
Principal, Ash Creek Associates

I certify that I am a registered Professional Geologist in the State of Florida and that this document and associated work comply with standard professional practices and Rule 62-770.600, Florida Administrative Code (F.A.C.) for Site Assessment. This report was prepared by me or under my direct supervision.

AMANDA L SPENCER LICENSE NO. PG2621 STATE OF FLORIDA PROFESSIONAL GEOLOGIST

Amanda Spencer, R.G.
Principal Hydrogeologist, Ash Creek Associates

3015 SW First Avenue
Portland, Oregon 97201-4707
(503) 924-4704 Portland
(360) 567-3977 Vancouver
(503) 943-6357 Fax
www.ashcreekassociates.com

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1.0 Introduction

This report presents the Remedial Action Plan (RAP) for the northern portion of the NuStar Terminals Operations Partnership L.P. (NuStar) Jacksonville Annex I Terminal located at 5800 Buffalo Avenue in Jacksonville, Florida (the Terminal; Figure 1). The former Florida Smelting Company (FSC) operated a smelter from approximately 1950 to 1960 in the vicinity of the northern boundary of the NuStar Terminal. Little information is available describing the historical operations at the FSC facility. Lead and arsenic, possibly associated with the FSC, are present in soil at the northern portion of the Terminal. This area is shown on Figure 2 and referred to hereafter as the Investigation Area.

This RAP is being submitted to the Florida Department of Environmental Protection (FDEP), on behalf of NuStar, in accordance with Rule 62-780.700, Florida Administrative Code (F.A.C.), and as requested by the FDEP in a letter dated October 6, 2011. In the October 6, 2011 letter, FDEP approved the May 6, 2011 Site Assessment Report Addendum (SARA) and previous reports, which collectively constituted complete Site Assessment activities under the F.A.C. The purpose of this RAP is to summarize soil and groundwater conditions in the Investigation Area and to present the proposed approach for mitigating risks to human health and the environment.

1.1 Objectives and Scope of Remedial Action Plan

The objectives of this RAP are to outline investigations and monitoring performed to date at the Site, to assess the current environmental conditions, and to propose a remedial program.

1.2 Organization of this Plan

This RAP is organized as follows:

- Background (Section 2) – A description of the Investigation Area, geology and hydrogeology, and previous site investigations;
- Current Extent of Constituents of Interest (Section 3) – A review of data collected to develop a comprehensive understanding of the extent of constituents at the Investigation Area;
- Site Conceptual Model (Section 4) – A review of current exposure pathways, consistent with the Cleanup Target Levels (CTLs) developed for the FDEP;
- Remedial Action Plan (Section 5) – Selection of the most appropriate remedial action objectives (RAOs) for the Investigation Area, and the rationale and approach for the proposed remedial actions; and
- Schedule (Section 6) - Proposed schedule for implementation of the RAP.

2.0 Background

This section provides a brief description of the Investigation Area, geology and hydrogeology, and a summary of previous Investigation Area assessment activities conducted by NuStar. Additional background information, details regarding previous site assessment work conducted by the U.S. Environmental Protection Agency (EPA) and CSX Transportation (CSXT) since 2005, and a survey of area potable water wells, were included in the *Site Assessment Report* (Ash Creek, 2010).

2.1 Investigation Area Description and History

The Investigation Area is located at the northern end of the NuStar Terminal. The Terminal was constructed in 1981 and has been used since that time as a bulk petroleum terminal. The Investigation Area contains a rail spur, five aboveground storage tanks (ASTs), and a truck loading rack. The tanks and loading rack are no longer in use. Approximately half of the Investigation Area is unpaved. The remainder of the Investigation Area is covered with concrete or asphalt-concrete. There are no known underground structures or storage tanks present at the Investigation Area.

The NuStar Terminal is zoned *Industrial Heavy* (IH) by the City of Jacksonville. According Section 656.323 of the Jacksonville Florida Zoning Code, residential uses of IH-zoned properties are not allowed, unless the use is accessory to industrial uses (e.g. a night watchman residence)

According to the *Preliminary Assessment/Site Inspection Report* (T N & Associates [TNA], 2005), the FSC operated in the vicinity of the northern boundary of the NuStar property. There is some uncertainty about the exact location of the smelter, but it may have occupied a portion of the Investigation Area and the adjacent property to the north, owned by CSXT. Details about the smelter activities are not available.

2.2 Geology and Hydrology

The following two sections provide a summary of regional and Investigation Area geology and hydrogeology, based on previous reports of investigations near the Investigation Area (Ash Creek Associates, Inc. [Ash Creek], 2010 and 2011; HSA Engineers & Scientists [HSA], 2007; HSA, 2009).

2.2.1 Regional Geology and Hydrogeology

Regionally, surficial deposits consist of Holocene and Pleistocene Age undifferentiated marine deposits and Pliocene and Upper Miocene interbedded sand, clay, and limestone (HSA, 2009). In Duval County, the thickness of these deposits ranges between 80 and 100 feet on average. These surficial deposits are underlain by the Hawthorn Group, which is comprised of low-permeability blue-green clay, sand, dolomite, limestone, and phosphate. The tan fossiliferous limestone of the Ocala Group underlies the Hawthorn Group.

Shallow groundwater is typically encountered in the surficial deposits. The Hawthorn Group, which is typically between 250 and 500 feet thick in Duval County, acts as a confining unit between the upper surficial deposits and the underlying Floridan Aquifer.. The Floridan Aquifer is the principal source of drinking water for Duval County. The Ocala Group is a part of the Floridan Aquifer.

2.2.2 Investigation Area Vicinity Geology and Hydrogeology

Subsurface soils encountered during previous investigations in the Investigation Area vicinity consist of fine-to medium-grained sands to the maximum depth explored of approximately 25 feet below ground surface (bgs). Soil encountered during NuStar site assessment activities were similar and consisted of brown to grayish brown fine- to medium-grained sand to the maximum depth explored of 7 feet bgs.

Depth to groundwater measured during the September 2010 and March 2011 NuStar site assessments ranged between approximately 4 and 6 feet bgs (Ash Creek, 2010 and 2011). The depth to water measured in four groundwater monitoring wells at the CSXT property, adjacent to the Investigation Area, in June and July 2010 ranged from 4.86 to 10.77 feet bgs, corresponding to groundwater elevations ranging from 7.93 to 9.23 feet above mean sea level (MSL; Arcadis, 2010).

The groundwater gradient in the Investigation Area vicinity is approximately 0.005 to the southeast (Ash Creek, 2011). The groundwater flow direction observed at the CSXT property north of the Investigation Area has been east-southeast (Arcadis, 2010).

2.3 Summary Previous Site Assessment Activities

EPA Soil Assessment. TNA conducted a Preliminary Assessment, on behalf of the EPA, at the CSXT and NuStar properties in 2005 to determine if the historical FSC operations had impacted soil (TNA, 2005). Twenty surface soil and five subsurface soil samples were collected, at the locations shown on Figure 3; five of the soil samples (16-SS through 20-SS) were collected on NuStar property. Investigation Area analytical data from the Preliminary Assessment are included in Appendix A. NuStar subsequently performed additional assessment of soil and groundwater in the Investigation Area, as described below.

September 2010 Investigation Area Assessment. In September 2010, soil samples were collected via hand auger from seven locations in the Investigation Area (SS-1 through SS-7; Figure 3), from 0.5 to 1.0 foot bgs ("shallow") and from 2.0 to 2.5 feet bgs ("deeper"). Grab-groundwater samples were collected from temporary wells installed within four of the hand-augered borings (SS-2, SS-3, SS-4, and SS-6; Figure 4). Soil and groundwater were analyzed for lead, arsenic, and benzo(a)pyrene equivalents.

Concentrations of lead and arsenic detected in soil samples collected from locations SS-4 through SS-7 did not exceed the residential or industrial FDEP soil cleanup target levels (SCTLs). Soil samples from locations SS-1, SS-2, and SS-3 exceeded one or more SCTL (residential and/or industrial) for lead and

arsenic. The September 2010 work defined the horizontal extent of arsenic and lead in the Investigation Area to the south and east. The characterization of lead and arsenic to the north and to the west of the Investigation Area was conducted by CSXT in January 2011. The analytical results of the soil samples are summarized in Tables 1 and 2. The lead and arsenic soil sampling results are shown on Figures 5 and 6.

Groundwater sampling results are summarized in Table 3. Dissolved lead was below the FDEP groundwater cleanup target level (GCTL) of 15 micrograms per liter (µg/L) at locations SS-4 and SS-6; dissolved lead slightly exceeded the GCTL in the grab sample from SS-2. The total lead concentrations detected in grab-groundwater samples collected from explorations SS-2, SS-4, and SS-6 exceeded the GCTL. With the exception of the grab-groundwater sample from location SS-2, neither total nor dissolved arsenic was detected above the GCTL in the grab groundwater samples collected from the Investigation Area, including at downgradient sample location SS-6. The detected dissolved arsenic concentration in the sample collected from location SS-2 was 10.6 µg/L, which just slightly exceeded the GCTL of 10 µg/L. Lead groundwater sample data are shown on Figure 7.

Benzo(a)pyrene equivalent concentrations in the soil samples were below SCTLs, with the exception of the shallow sample collected from location SS-1, which exceeded the residential SCTL. No SCTL exceedances for benzo(a)pyrene were detected in the samples collected from explorations SS-2 through SS-7. Benzo(a)pyrene equivalents were not detected in the total or dissolved groundwater samples. Polycyclic aromatic hydrocarbon (PAH) data in soil and groundwater are compiled in Tables 2 and 4, respectively.

March 2011 Investigation Area Assessment Activities. Additional assessment activities were performed by NuStar in March 2011. Soil samples were collected from two hand auger explorations (SS-8 and SS-9; Figure 3) from 0.5 to 1.0 foot bgs ("shallow") and from 2.0 to 2.5 feet bgs ("deeper"). These samples were collected south of the Investigation Area to complete the delineation of constituents of interest in soil. Soil samples were analyzed for arsenic and lead. As shown in Table 1, lead concentrations detected in shallow soil samples collected from borings SS-8 and SS-9 were below both residential and industrial SCTLs. Arsenic concentrations detected in the shallow samples, collected from borings SS-8 and SS-9, were below the industrial SCTL. The arsenic concentration detected in the shallow sample collected from boring SS-8 (2.43 milligrams per kilogram [mg/kg]), slightly exceeded the residential SCTL of 2.1 mg/kg.

A groundwater monitoring well (ACA-1) was installed at location SS-2, where the highest concentration of lead was detected in soil and groundwater during the 2010 site assessment. Groundwater samples were collected from well ACA-1, previously installed NuStar well ACA-9 (south and downgradient of the Investigation Area), and CSXT monitoring well MW-5 (crossgradient/downgradient of the Investigation Area). The groundwater samples were analyzed for total and dissolved concentrations of arsenic and lead.

As shown in Table 3, the total lead concentrations detected in the groundwater sample collected from well ACA-1 (18 µg/L) slightly exceeded the GCTL of 15 µg/L. The dissolved concentration of lead detected in well ACA-1 was 11 µg/L, less than the GCTL of 15 µg/L. Lead was not detected in the total or dissolved

samples collected from CSXT well MW-5 or NuStar well ACA-9 at concentrations exceeding the GCTL. The groundwater analytical results are shown in Tables 3 and 4, along with the groundwater analytical results from the September 2010 site assessment activities. Figure 7 shows the lead groundwater analytical results, including applicable data collected in July 2010 at the CSXT property and data collected in September 2010 in the Investigation Area.

Following completion of the March 2011 assessment, FDEP (2011) issued a letter confirming that delineation of soil and groundwater had been completed. FDEP concluded that lead appears to be the only constituent of concern in groundwater.

3.0 Current Extent of Constituents of Interest

The constituents of interest (COI) at the Site are arsenic and lead. PAHs are not a COI because PAHs were only detected in one Investigation Area soil sample at a concentration exceeding the residential SCTL, the former smelter is not a known source of PAHs, and no PAHs were detected in groundwater. The sections below describe the nature and extent of the COI in soil and groundwater, respectively. To assist in the discussions on extent, the data have been compared to CTLs. The FDEP has published CTLs for chemicals commonly found in soil and groundwater at facilities where releases of hazardous substances have occurred (FDEP, 2005). According to the Technical Report (FDEP, 2005) the minimum criteria for GCTLs were developed based on health considerations and aesthetic factors. SCTLs were developed based on human contact.

3.1 Soil

Soil samples have been collected from shallow (0.5 to 1.0 foot bgs) and deeper (2.0 to 2.5 feet bgs) intervals in nine hand auger borings in the Investigation Area, for a total of 26 soil samples. Analytical results are summarized in Tables 1 and 3. Figures 5 and 6 display the concentrations of lead and arsenic, respectively, that were detected during the investigations.

Soil with lead concentrations exceeding residential and/or industrial SCTLs in the Investigation Area is limited to locations SS-1, SS-2, and SS-3, located immediately south of the property boundary near the former FSC location. Both shallow and deeper soil sampling results at locations SS-4, SS-5, SS-6, and SS-7 were below residential and industrial SCTLs. Lead soil sampling results at locations SS-8 and SS-9 were below residential and industrial SCTLs.

Concentrations of arsenic were below industrial SCTLs at all sampling locations at the NuStar Terminal, except the deeper sample collected from location SS-2. Arsenic concentrations were also below residential SCTLs except at locations SS-1, SS-2, and SS-3.

As shown on Figures 5 and 6, lead concentrations exceeding the industrial SCTL are confined to soil samples collected between the surface and approximately 2.5 feet bgs from hand auger borings SS-1, -2, and -3, near the northern boundary of the Investigation Area. Arsenic was only detected at a concentration that exceeded the industrial SCTL in deeper soil at boring SS-2

3.2 Groundwater

Groundwater conditions in the Investigation Area have been evaluated based on data collected from two groundwater monitoring wells (ACA-1 and MW-9) and four temporary borings (SS-2, SS-3, SS-4, and SS-6). Additional data about off-site groundwater conditions at the CSXT property are compiled in Appendix B. Groundwater analytical results for lead and arsenic in the Investigation Area are listed in Table 3 and shown on Figures 7 and 8, respectively.

Dissolved lead was not detected in grab-groundwater samples at concentrations above GCTLs, with the exception of one sample collected from temporary well location SS-2 (825 µg/L). Review of the data suggested that the results were influenced by turbidity in the grab sample; therefore, a groundwater monitoring well was installed at location SS-2 to better assess groundwater conditions. The concentration of dissolved lead detected in the groundwater monitoring well ACA-1 (11 µg/L) is below the GCTL of 15 µg/L; however, the corresponding total lead concentration from well ACA-1 (18 µg/L) slightly exceeds the GCTL. A comparison of lead data for groundwater samples collected from temporary boring SS-2 and monitoring well ACA-1 confirmed that the lead concentrations detected in the grab-groundwater sample from SS-2 were elevated due to sample turbidity and were not representative of actual groundwater conditions. The results demonstrate that there is little to no leachable fraction in the lead in soil from the former smelter operations.

The concentrations of lead detected in samples collected from CSXT well MW-5, located east and slightly north of well ACA-1, and NuStar well MW-9, located approximately 480 feet southeast of well ACA-1, were below GCTLs. Additionally, the dissolved groundwater samples collected from borings SS-3 and SS-4 (east of ACA-1) and SS-6 (southeast of ACA-1) in September 2010 were non-detect or significantly below the applicable GCTL. Based on the difference between the results of the grab groundwater sample collected from boring SS-2 and the groundwater sample collected from permanent well ACA-1, it is likely that the total lead concentrations detected in the grab samples from borings SS-3, SS-4, and SS-6 are higher than the actual concentrations in groundwater at those locations due to turbidity in the samples.

Dissolved arsenic was not detected in grab-groundwater samples at concentrations above GCTLs, with the exception of one sample collected from temporary well location SS-2 (10.6 µg/L). The dissolved arsenic concentration detected in the grab sample from SS-2 only slightly exceeded the GCTL (10 µg/L). Based on a comparison of lead data for grab samples and monitoring well samples, it appears clear that the grab samples from SS-2 were biased high by turbidity in the water. This analysis of the data suggests that the concentration of arsenic in the Investigation Area is less than 10.6 µg/L and below the GCTL.

4.0 Conceptual Site Model

This section describes the conceptual site model and evaluates potential risks associated with the distribution of COI at the Site.

4.1 Current and Future Site Use

Land Use. The Investigation Area is an unused portion of the NuStar Jacksonville Annex I bulk petroleum terminal. Access to the terminal is restricted to authorized NuStar employees, contractors, and drivers. There are no residential uses at or adjacent to the Investigation Area. NuStar has no plans to change land uses in the foreseeable future. The NuStar Terminal is zoned Industrial Heavy (IH) by the City of Jacksonville. The IH zoning designation prohibits residential uses except if they are accessory to industrial use.

Groundwater. Groundwater at and in the vicinity of the Investigation Area is not currently accessed for use. A potable well survey, completed by Arcadis (2010) indicates no public water supply wells are within 0.5 mile of the Investigation Area and no private wells are within 0.25 mile. Shallow groundwater in the region, and specifically near coastal areas such as Jacksonville, is susceptible to salt water intrusion. Municipal supplies, provided by the City of Jacksonville, are available for the Terminal. Based on the absence of nearby supply wells and the availability of municipal supplies, it is not reasonably likely that groundwater will be used for domestic purposes in the future at the Investigation Area.

Surface Water Bodies. There are no surface water bodies adjacent to the Site. The nearest surface water body, the St. Johns River, is approximately 2,000 feet east of the Investigation Area. Previous assessment data indicate that lead impacts to groundwater are limited to a small portion of the Investigation Area (vicinity of well ACA-1) and have not migrated outside of that area. Therefore, COI in the Investigation Area will not affect the St. Johns River.

4.2 Analysis of Exposure Pathways

To aid in developing RAOs, soil- and groundwater-to-receptor exposure pathways were evaluated to assess which pathways may potentially be complete at the Investigation Area. Potential exposure pathways are described below and are shown on Figure 9:

- Surface soil (0 to 2 feet) to human or ecological receptors via direct contact;
- Subsurface soil (greater than 2 feet) to human receptors via direct contact;
- Groundwater to human receptors via direct contact (i.e., groundwater containing dissolved-phase constituents that are accessed when workers excavate to or below the water table);

- Groundwater to aquatic receptors in surface water (i.e., groundwater containing dissolved-phase constituents discharging to a surface water body that provides habitat to aquatic receptors);
- Groundwater to human receptors via domestic water use; and
- Groundwater to air via vapor intrusion.

Each of these potential pathways is evaluated below and potentially complete pathways are identified.

Surface Soil Direct Contact. Arsenic was detected in four samples (from borings SS-1, SS-2, SS-3, and SS-8) in the 0.5- to 2-foot soil interval at concentrations that exceed the residential SCTL; one of those samples (from boring SS-2) also exceeded the industrial SCTL. Lead was detected in two samples (from borings SS-1 and SS-3) in the 0.5- to 2-foot soil interval at concentrations that exceed the industrial SCTL. Therefore, surface soil direct contact is a complete pathway and is evaluated further in Section 5.

Subsurface Soil Direct Contact. Lead and arsenic were detected in two samples (from borings SS-2 and SS-3) in the 2- to 2.5-foot soil interval at concentrations that exceed the industrial SCTLs (see Figures 5 and 6). Therefore, this is a potentially complete pathway and is evaluated further in Section 5.

Groundwater Direct Contact. Human receptors could access and have direct contact with groundwater in excavations. The dissolved lead and arsenic concentrations in groundwater, represented by data from well ACA-1, do not exceed GCTLs; however, only one round of groundwater data is available from well ACA-1. The direct contact within excavations is considered a potentially complete pathway, pending collection of additional data from well ACA-1.

Groundwater to Surface Water. Groundwater in the region flows south and southeast towards the St. Johns River following a slight gradient. Based on the limited hydraulic gradient, the absence of dissolved lead in downgradient monitoring well MW-9, and the significant distance (more than 2,000 feet) to the nearest surface water body (the St. Johns River), groundwater will not migrate to surface water bodies at concentrations of potential concern. Therefore, groundwater to surface water is not a potentially complete pathway at the Investigation Area.

Groundwater as Domestic Water Source. Groundwater at and near the Investigation Area is not currently used for either domestic or agricultural purposes. In addition, the proximity to the St. John's River exposes remaining groundwater to salt water intrusion if accessed for sufficient extraction for domestic or other usage. Therefore, shallow groundwater as a domestic water source is not a complete exposure pathway at or downgradient of the Investigation Area.

Groundwater to Vapor. The COI are non-volatile and do not volatilize to air. There are no buildings present at the Investigation Area nor is it likely that buildings will be constructed for occupational use in the

foreseeable future. Therefore, vapor intrusion into buildings is not a potentially complete pathway at the Investigation Area.

5.0 Remedial Action Plan

This section identifies constituents of potential concern and evaluates and proposes RAOs and the recommended remedial approach to meet the RAOs.

5.1 Constituents of Potential Concern

As detailed in Section 4, the potentially complete exposure pathways at the Site are:

- Direct contact with surface (i.e. 0 to 2 foot depth) soil;
- Direct contact with subsurface (i.e., 2+ foot depth) soil; and
- Direct contact with groundwater during onsite excavation.

Surface Soil Direct Contact. Industrial Soil Cleanup Target Levels were used to screen soil data at the Site. Lead was detected above the SCTL for industrial soil at one location (SS-1; see Figure 5). Arsenic was not detected in surface soil at a concentration exceeding the industrial SCTL (see Figure 6). Despite the lead SCTL exceedance, the actual risk posed by lead in surface soil is very low. The exposure duration assumptions used to develop the SCTLs assume access will occur 250 days per year for 8 hours a day. However, the Investigation Area is at a portion of the NuStar terminal that is rarely used (no operations areas are included in the Investigation Area). Therefore, the assumptions of the SCTLs significantly overestimate the actual exposure duration that would be experienced. The actual risk posed by lead in surface soil in the Investigation Area is very low; however, the lead concentration in one surface soil sample exceeds the corresponding SCTL, and therefore, lead is a surface soil COPC.

Subsurface Soil Direct Contact. As can be seen in Table 1, lead was detected above the industrial SCTL at two subsurface soil locations and arsenic was detected above the SCTL at one subsurface location (Figures 5 and 6). Despite the SCTL exceedances, the actual risks posed by lead and arsenic in subsurface soil are very low. Subsurface soil at the Site is and for the foreseeable future will be only rarely accessed, and the assumptions of the SCTLs significantly overestimate the actual exposure duration that would be experienced at the Investigation Area. No construction activities are planned in the Investigation Area that would result in exposure to subsurface soil. Therefore, based on this evaluation, the limited concentrations of lead and arsenic in Investigation Area soil are unlikely to present an unacceptable health risk. Lead and arsenic are considered COPCs because the concentrations in subsurface soil exceed corresponding SCTLs.

Groundwater Direct Contact. GCTLs were used to screen the groundwater data at the Site. The screening was performed using total and dissolved concentrations from monitoring well ACA-1. Monitoring

well data were used for the evaluation because turbidity in monitoring well samples is minimized and, therefore, the samples are more representative of COI concentrations in groundwater. As can be seen in Table 3, dissolved-phase concentrations of lead and arsenic in monitoring well samples are less than the corresponding GCTLs, but the concentration of total lead in well ACA-1 slightly exceeds the GCTL. Due to the exceedance of the lead GCTL, lead is considered a COPC for groundwater. As indicated by DEP (2011), lead will be eliminated as a COPC if data from two consecutive sampling events are lower than the corresponding GCTL. Therefore, the groundwater will be monitored on a periodic basis to evaluate lead concentrations.

5.2 Remedial Action Objectives and Proposed Action

As identified above, the only potentially complete pathways which may pose unacceptable health risks are direct contact with soil and groundwater in excavations. The Investigation Area is expected to remain part of the NuStar Terminal, with access restricted to authorized personnel. Surrounding land uses are not expected to change. Therefore, RAOs were developed that are protective of worker exposure via direct contact with lead and arsenic in soil and lead in groundwater. These RAOs are:

- Prevent worker exposure to COPCs in soil by implementation of engineering and institutional controls.
- Confirm that lead concentrations in groundwater are less than GCTLs.
- Monitor that land and water use at the Terminal remains unchanged or, if a change in groundwater use is identified, confirm that residual levels of COPCs will not present an unacceptable risk for proposed change in use.

5.3 Proposed Action

Engineering Control. The Remedial Action Area (RAA), shown on Figure 10, consists of that portion of the Investigation Area where COPCs are present in soil at concentrations that exceed SCTLs for applicable exposure scenarios. An engineered cap, consisting of asphalt-concrete, concrete, or some combination thereof, will be installed on the ground surface in the RAA to prevent worker exposure to soil. As shown on Figure 10, a significant portion of the RAA is currently covered with asphalt-concrete and concrete pavement. The existing pavement effectively caps the impacted soil; therefore, for the remedial action, additional concrete or asphalt-concrete pavement will be installed over areas that are currently unpaved. The cap will consist of at least a 3-inch-thick layer of asphalt-concrete or concrete over an appropriate base material. At the completion of the remedial action, all soil in the RAA will be covered with concrete or asphalt-concrete pavement, with the exception of a small area inside of the AST containment structure. Following construction of the cap, per F.A.C. 62-780.680(2), a registered Professional Engineer will certify that the completed cap has been constructed consistent with commonly accepted engineering practices, and is appropriately designed and constructed for its intended purpose.

Soil inside of the containment area occupies a very small portion of the RAA (approximately 3,000 square feet) and will not be capped because: (1) extensive aboveground piping networks and containment structures severely limit mobility in that area, preventing access for construction equipment; (2) most of the ground surface in the containment area is currently covered with gravel, minimizing the potential for direct contact with soil; (3) workers rarely enter the containment area since the tanks are inactive and do not require routine operations and maintenance activities.

Contaminated Media Management Plan. A contaminated media management plan (CMMP) will be prepared for the Investigation Area to provide guidance for future activities in that area. At a minimum, the CMMP will contain a soil management plan and will address worker health and safety, soil management and disposal, and cap inspection and maintenance requirements. The CMMP will be maintained at the Terminal and made available to all necessary personnel. Following completion of two groundwater monitoring events, groundwater data will be evaluated to assess whether this media should be included in the CMMP. If groundwater remains a media of concern following the two monitoring events, the CMMP will be expanded to include groundwater.

Institutional Controls. An institutional control, consisting of a restrictive covenant, will be applied to the Investigation Area portion of the Terminal property. The restrictive covenant will be implemented and recorded to ensure that the engineering control is properly maintained and to ensure that FDEP has access to the property to inspect the engineering control. The restrictive covenant will be prepared and implemented in accordance with guidance prepared by FDEP (2010).

Groundwater Monitoring. As requested by FDEP (2011), groundwater samples will be collected from well ACA-1 during two monitoring events, to be conducted approximately 3 months apart. The samples will be submitted for analysis of total and dissolved lead. If the analyses indicate that lead concentrations are less than the GCTL, lead will be removed as a COPC, additional groundwater monitoring will not be required, and the CMMP will not be amended to include groundwater.

A RAP Summary is attached as Appendix C.

6.0 Schedule

The schedule for implementing the RAP was developed in accordance with Table A of F.A.C Chapter 62-780, and is summarized below.

Activity	Schedule
Groundwater Monitoring at Well ACA-1 (Event #1)	Within 120 days of approval of the RAP
Implement Remedial Action Plan	Within 120 days of approval of the RAP
Groundwater Monitoring at Well ACA-1 (Event #2)	Within 210 days of approval of the RAP
Submit Site Rehabilitation Completion Report	Within 120 days of completion of the engineering control

7.0 References

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Tables

Table 1: Soil Sampling Results — Metals
NuStar Terminals Operations Partnership L.P. Jacksonville Annex I Facility
Jacksonville, Florida

Sample ID	SS-1 (6-12)	SS-1 (24-30)	SS-2 (6-12)	SS-2 (24-30)	SS-3 (6-12)	SS-3 (24-30)	SS-4 (6-12)	SS-4 (24-30)	SS-5 (6-12)	SS-5 (24-30)	SS-6 (6-12)	SS-6 (24-30)	SS-7 (6-12)	SS-7 (24-30)	SS-8 (6-12)	SS-9 (6-12)	Background Concentration	Florida Soil Cleanup Target Levels	
Sample Date	9/9/2010	9/9/2010	9/9/2010	9/9/2010	9/9/2010	9/9/2010	9/9/2010	9/9/2010	9/9/2010	9/9/2010	9/9/2010	9/9/2010	9/9/2010	9/9/2010	3/29/2011	3/29/2011		Direct Exposure	
Sample Depth (feet bgs)	0.5 - 1.0	2.0 - 2.5	0.5 - 1.0	2.0 - 2.5	0.5 - 1.0	2.0 - 2.5	0.5 - 1.0	2.0 - 2.5	0.5 - 1.0	2.0 - 2.5	0.5 - 1.0	2.0 - 2.5	0.5 - 1.0	2.0 - 2.5	0.5 - 1.0	0.5 - 1.0	EPA Site Assessment[6]	Residential	Industrial
Metals	Concentrations in mg/kg (ppm)																		
Arsenic	**4.3**	1.6 I	2.9	**16**	**7.9**	3.8	1.3 I	1.1 I	1.1 I	0.9 I	0.7 I	0.8 I	0.8 I	1.1 I	2.43	1.91	3.9	2.1	12
Lead	**16,000**	120	190	**16,000**	**540**	**3,400**	370	86	59	3.1	30	2.4	33	5.9	7.02	13.6	92	400	1,400

Notes:

1. mg/kg (ppm) = Milligrams per kilogram (parts per million)
2. -- = Not analyzed or not applicable
3. **Bolded** values indicate detected concentrations exceeding background concentration and FDEP Soil Cleanup Target Levels
4. I = Concentration detected is between the laboratory method detection limit and the laboratory practical quantitation limi
5. Florida Department of Environmental Protection Soil Cleanup Target Levels per Chapter 62-777, F.A.C
6. Background metals concentrations as determined in EPA 2005 Site Assessment Report. (T N & Associates, 2005. Preliminary Assessment/Site Inspection Report; Florida Smelting Company/Buffalo Avenue. September 30, 200
7. feet bgs = Feet below the ground surface
8. Lead and Arsenic analyzed by EPA Method 6010B

Table 2: Soil Sampling Results — PAHs
NuStar Terminals Operations Partnership L.P. Jacksonville Annex I Facility
Jacksonville, Florida

Sample ID	SS-1 (6-12)	SS-1 (24-30)	SS-2 (6-12)	SS-2 (24-30)	SS-3 (6-12)	SS-3 (24-30)	SS-4 (6-12)	SS-4 (24-30)	SS-5 (6-12)	SS-5 (24-30)	SS-6 (6-12)	SS-6 (24-30)	SS-7 (6-12)	SS-7 (24-30)	Florida Soil Cleanup Target Levels		
															Direct Exposure		Leachability
Sample Depth (feet bgs)	0.5 - 1.0	2.0 - 2.5	0.5 - 1.0	2.0 - 2.5	0.5 - 1.0	2.0 - 2.5	0.5 - 1.0	2.0 - 2.5	0.5 - 1.0	2.0 - 2.5	0.5 - 1.0	2.0 - 2.5	0.5 - 1.0	2.0 - 2.5	Residential	Industrial	Groundwater
Semi-Volatiles	Concentrations in mg/kg (ppm)																
Benzo(a)Anthracene	0.10	0.0083	0.017	--	0.019 I	--	<0.0052	--	0.030	--	0.024	--	0.032	--	*	*	0.8
Chrysene	0.14	0.011	0.025	--	0.051	--	0.013 I	--	0.035	--	0.026	--	0.034	--	*	*	77
Benzo(b)Fluoranthene	0.17	0.012	0.046	--	0.084	--	<0.0082	--	0.040	--	0.032	--	0.041	--	*	*	2.4
Benzo(k)Fluoranthene	0.13	0.0093	0.028 J	--	0.066	--	<0.0067	--	0.049	--	0.028	--	0.031 J1	--	*	*	24
Benzo(a)pyrene	0.12	0.0086	0.025	--	0.051	--	<0.012	--	0.037	--	0.028	--	0.036	--	0.1	0.7	8.0
Indeno(1,2,3-cd)Pyrene	0.083	0.0082	0.018	--	0.042	--	<0.0089	--	0.027	--	0.019	--	0.028	--	*	*	6.6
Dibenz(a,h)anthracene	<0.00055	0.0035 I	<0.00057	--	<0.0054	--	<0.0053	--	<0.00053	--	<0.00054	--	0.0097	--	*	*	0.7
Benzo(a)pyrene Equivalents*	**0.157**	0.015	0.034	--	0.069	--	0.0098	--	0.047	--	0.036	--	0.056	--	0.1*	0.7*	--

Notes:

1. mg/kg (ppm) = Milligrams per kilogram (parts per million).
2. * = Site concentrations for carcinogenic polycylic aromatic hydrocarbons must be converted to Benzo(a)pyrene equivalents before comparison with the appropriate direct exposure SCTL for Benzo(a)pyrene using the approach described in the February 2005 "Final Technical Report: Development of Clenaup Target Levels (CTLs) for Chapter 52-777, F.A.C."
3. -- = Not analyzed.
4. **Bolded** values indicate detected concentrations higher than at least one screening level value.
5. I = concentration detected is between the laboratory method detection limit and the laboratory practical quanititation limi
6. Florida Department of Environmental Protection Soil Cleanup Target Levels per Chapter 62-777, F.A.C
7. J = The RPD between the primary and duplicate samples exceed quality control limits. The detected concentration is estimatec
8. J1 = The continuing calibration verification for this analyte was outside the upper control criterion. The associated result could be biased higl

Table 3: Groundwater Sampling Results — Metals
NuStar Terminals Operations Partnership L.P. Jacksonville Annex I Facility
Jacksonville, Florida

Sample ID	SS-2	SS-3	SS-4	SS-6	ACA-1	MW-5	MW-9	Florida Groundwater Cleanup Target Levels
Sample Date	9/9/2010	9/10/2010	9/9/2010	9/9/2010	3/30/2011	4/6/2011	4/2/2011	
Metals	Concentrations in mg/L (ppm)							
Total Arsenic	**0.0204**	0.00139	0.00104	0.00333	--	--	--	0.010
Dissolved Arsenic	**0.0106**	0.00113	0.00072 B	0.00037 I B	--	--	--	0.010
Total Lead	**2.71**	0.0091	**0.036**	**0.0504**	**0.018**	0.001 I	0.003 I	0.015
Dissolved Lead	**0.827**	0.0017	0.0016	<0.0003	0.011	0.001 I	<0.0007	0.015

Notes:

1. mg/L (ppm) = Milligrams per liter (parts per million).
2. **Bolded** values indicate detected concentrations exceeding background concentration and FDEP Groundwater Cleanup Target Levels
3. I = Concentration detected is between the laboratory method detection limit and the laboratory practical quantitation limit
4. B = Analyte was detected in the sample at a concentration equal to or less than the concentration detected in the associated method blank
5. Florida Department of Environmental Protection Groundwater Cleanup Target Levels per Chapter 62-777, F.A.C
6. -- = Not analyzed.
7. Lead and Arsenic analyzed by EPA Method 6010B.

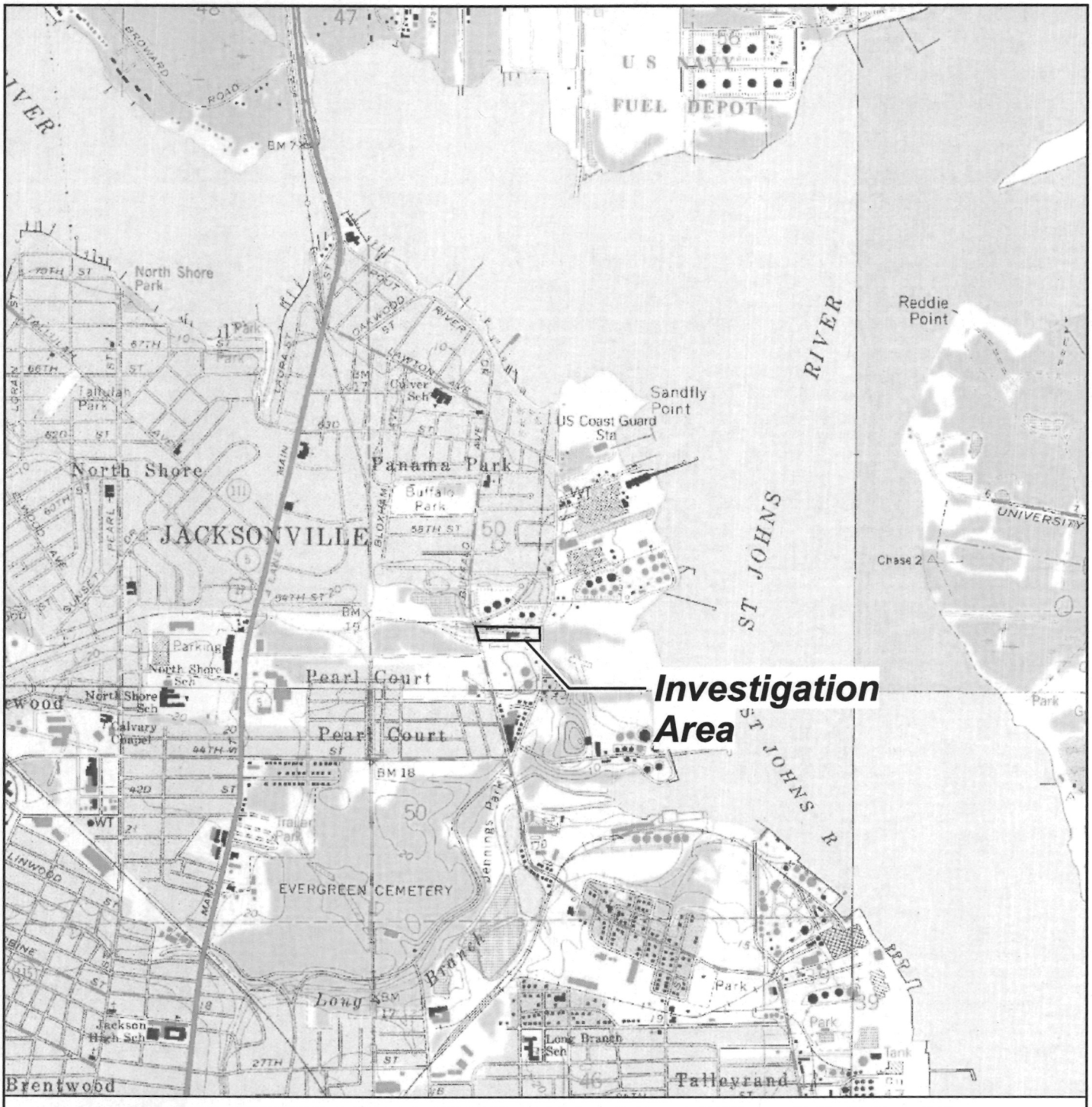
Table 4: Groundwater Sampling Results — PAHs
NuStar Terminals Operations Partnership L.P. Jacksonville Annex I Facility
Jacksonville, Florida

Sample ID	SS-2	SS-3	SS-4	SS-6	Florida Groundwater Cleanup Target Levels
Depth to water (feet bgs)	5.93	4.95	4.30	3.91	
Semi-Volatiles	Concentrations in mg/L (ppm)				
Total Benzo(a)Anthracene	<0.000066	<0.000066	<0.000066	<0.000066	0.00005
Dissolved Benzo(a)Anthracene	<0.000080	<0.000066	<0.000066	<0.000066	0.00005
Total Chrysene	<0.000072	<0.000071	<0.000072	<0.000072	0.0048
Dissolved Chrysene	<0.000086	<0.000071	<0.000071	<0.000072	0.0048
Total Benzo(b)Fluoranthene	<0.000068	<0.000067	<0.000068	<0.000068	0.00005
Dissolved Benzo(b)Fluoranthene	<0.000081	<0.000067	<0.000067	<0.000068	0.00005
Total Benzo(k)Fluoranthene	<0.000075	<0.000074	<0.000075	<0.000075	0.0005
Dissolved Benzo(k)Fluoranthene	<0.000089	<0.000074	<0.000074	<0.000075	0.0005
Total Benzo(a)pyrene	<0.000053	<0.000053	<0.000053	<0.000053	0.0002
Dissolved Benzo(a)pyrene	<0.000063	<0.000053	<0.000053	<0.000053	0.0002
Total Indeno(1,2,3-cd)Pyrene	<0.000061	<0.000061	<0.000061	<0.000061	0.00005
Dissolved Indeno(1,2,3-cd)Pyrene	<0.000073	<0.000061	<0.000061	<0.000061	0.00005
Total Dibenz(a,h)anthracene	<0.000056	<0.000056	<0.000056	<0.000056	0.000005
Dissolved Dibenz(a,h)anthracene	<0.000067	<0.000056	<0.000056	<0.000056	0.000005

Notes:

1. mg/L (ppb) = Milligrams per liter (parts per million)
2. Florida Department of Environmental Protection Groundwater Cleanup Target Levels per Chapter 62-777, F.A.C

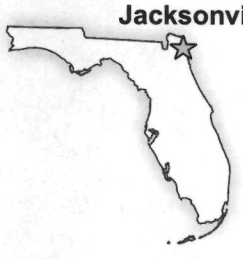
Figures



Note: Base map prepared from USGS 7.5-minute quadrangles of Trout River and Jacksonville, FL, revised 1992 as provided by TerraServer-USA.

0 2,000 4,000

Approximate Scale in Feet



FLORIDA

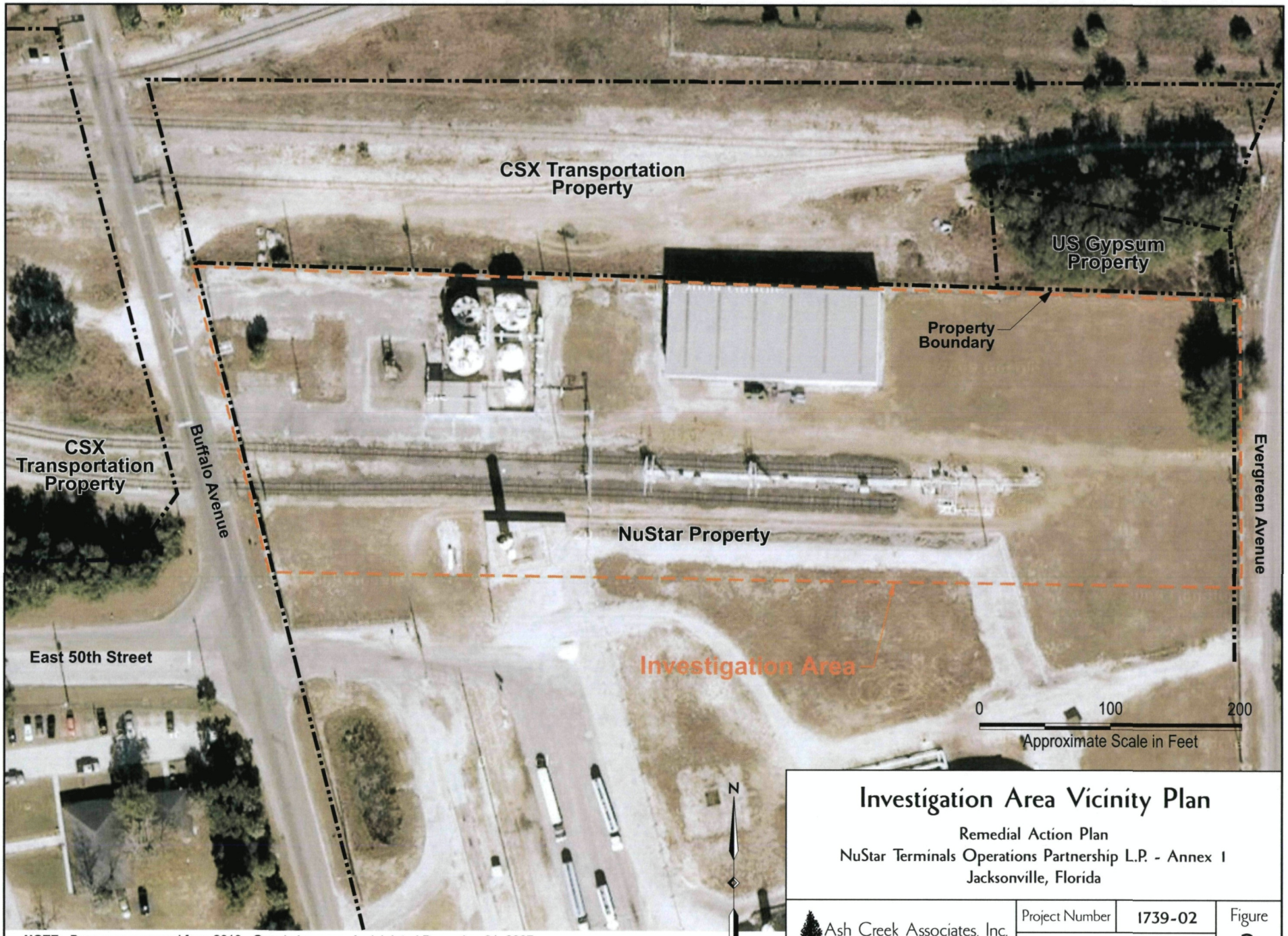
N

Investigation Area Location Map

Remedial Action Plan
NuStar Terminals Operations Partnership L.P. - Annex 1
Jacksonville, Florida

Ash Creek Associates, Inc.
Environmental and Geotechnical Consultants

Project Number	1739-02	Figure
December 2011		1

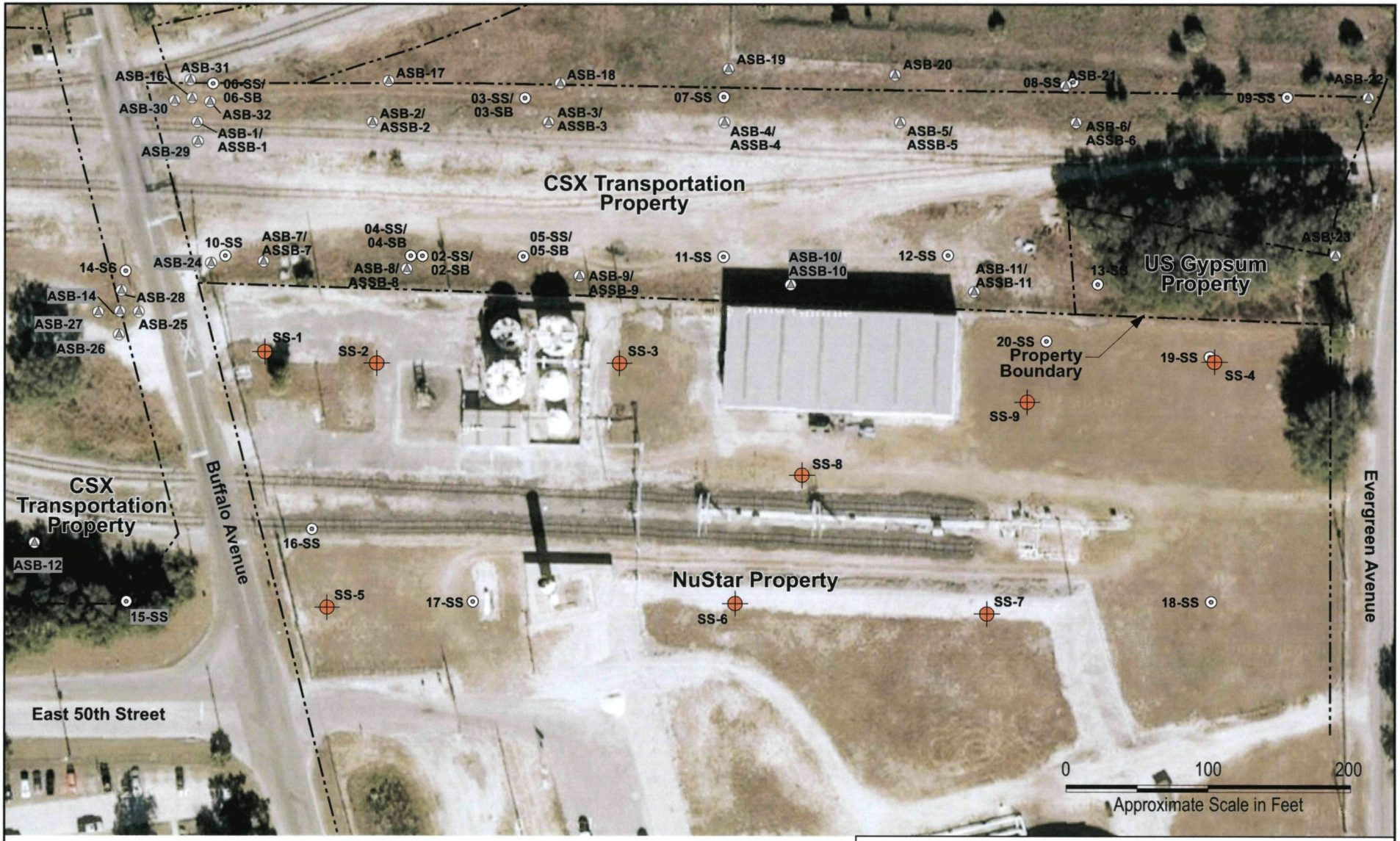


NOTE: Base map prepared from 2010 - Google Imagery. Aerial dated December 31, 2007.

Investigation Area Vicinity Plan

Remedial Action Plan
NuStar Terminals Operations Partnership L.P. - Annex 1
Jacksonville, Florida

Ash Creek Associates, Inc. Environmental and Geotechnical Consultants	Project Number	1739-02	Figure 2
	December 2011		



Legend:

SS-1 NuStar Soil Sampling Location (2010/2011)

03-SB Historical Soil Sampling Location (2005)

ASB-1 CSXT Soil Sampling Location (2009/2011)

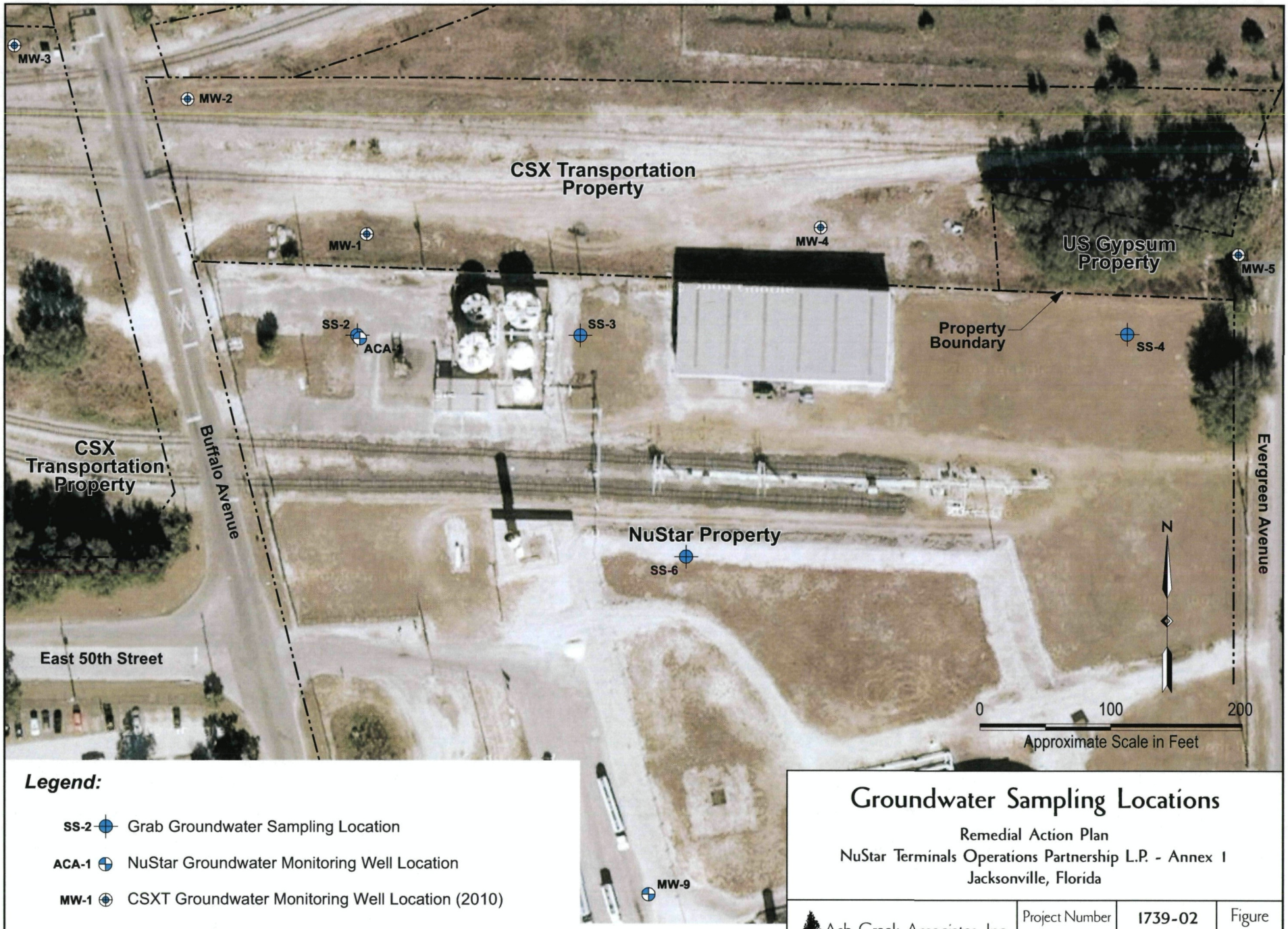
NOTE: Base map prepared from 2010 - Google Imagery. Aerial dated December 31, 2007.

N

Soil Sampling Locations

Remedial Action Plan
NuStar Terminals Operations Partnership L.P. - Annex 1
Jacksonville, Florida

Ash Creek Associates, Inc. Environmental and Geotechnical Consultants	Project Number	1739-02	Figure 3
	December 2011		



Legend:

- SS-2 — Grab Groundwater Sampling Location
- ACA-1 — NuStar Groundwater Monitoring Well Location
- MW-1 — CSXT Groundwater Monitoring Well Location (2010)

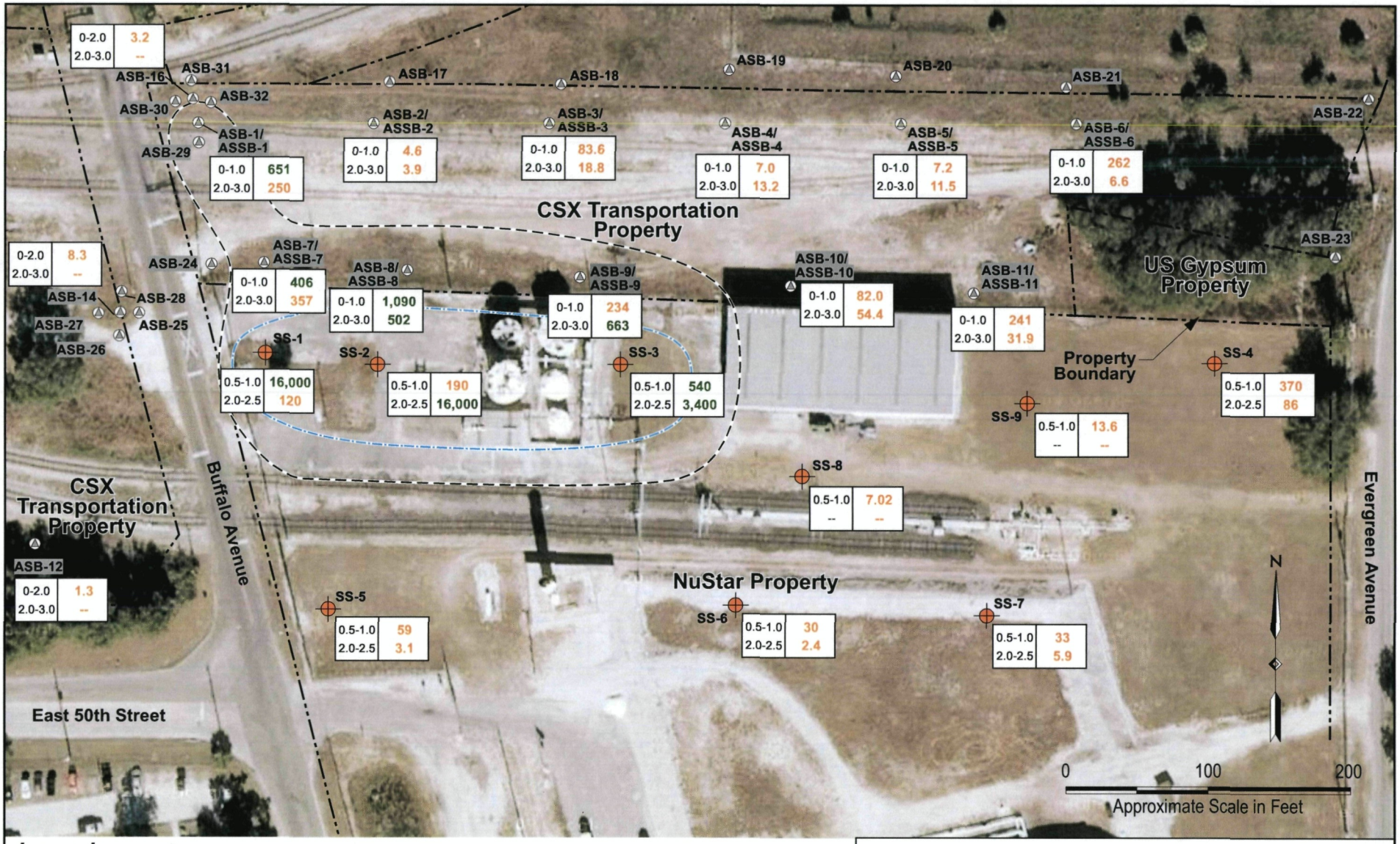
NOTE: Base map prepared from 2010 - Google Imagery. Aerial dated December 31, 2007.

Groundwater Sampling Locations

Remedial Action Plan
NuStar Terminals Operations Partnership L.P. - Annex 1
Jacksonville, Florida

Ash Creek Associates, Inc.
Environmental and Geotechnical Consultants

Project Number	1739-02	Figure
December 2011		4



Legend:

- SS-1 — NuStar Soil Sampling Location (2010/2011)
- ASB-1 — CSXT Soil Sampling Location (2009/2011)
- Approximate Extent of Soil with Lead Concentration Exceeding Residential SCTLs
- Approximate Extent of Soil with Lead Concentration Exceeding Industrial SCTLs

0.5-1.0 4.3 — Depth Sampled
2.0-2.5 16,000 — Lead Concentration in mg/kg
(Orange indicates a concentration below the residential and industrial SCTLs)

(Green indicates a concentration greater than the residential and industrial SCTLs)

Soil Cleanup Target Levels

(SCTLs)	Residential	Industrial
Lead	400	1,400

NOTE: Base map prepared from 2010 - Google Imagery. Aerial dated December 31, 2007.

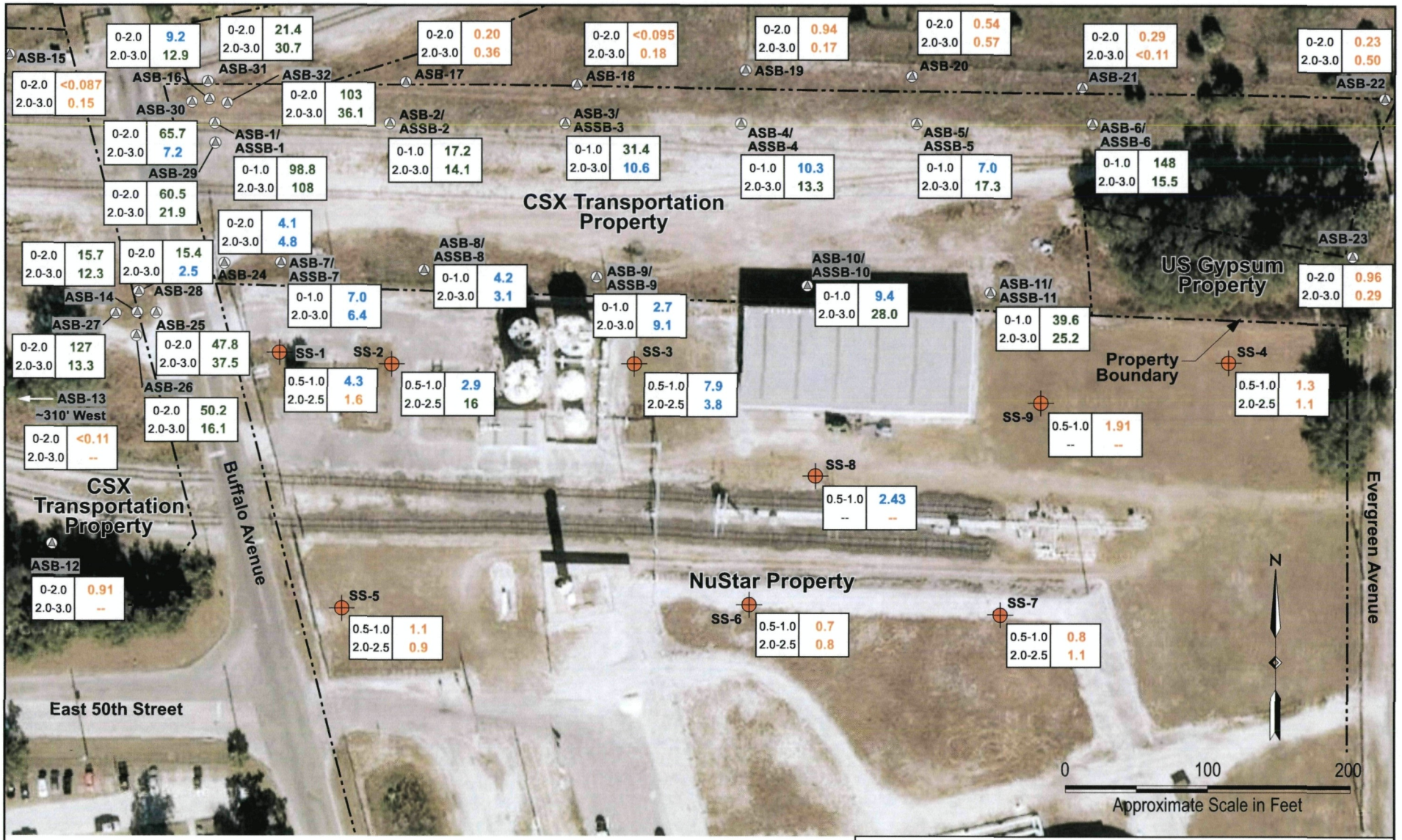
Lead Soil Sampling Results

Remedial Action Plan
NuStar Terminals Operations Partnership L.P. - Annex 1
Jacksonville, Florida

Ash Creek Associates, Inc.
Environmental and Geotechnical Consultants

Project Number 1739-02
December 2011

Figure 5



Legend:

SS-1 ⊕ NuStar Soil Sampling Location (2010/2011)

ASB-1 △ CSXT Soil Sampling Location (2009/2011)

0.5-1.0 / 2.0-2.5 — 2.9 / 16

Depth Sampled

Arsenic Concentration in mg/kg
(Orange indicates a concentration below the residential and industrial SCTLs)
(Blue indicates a concentration below the industrial but above the residential SCTL)
(Green indicates a concentration above both SCTLs)

-- Not Sampled

Soil Cleanup Target Levels

(SCTLs)	Residential	Industrial
Arsenic	2.1	12

NOTE: Base map prepared from 2010 - Google Imagery. Aerial dated December 31, 2007.

Arsenic Soil Sampling Results

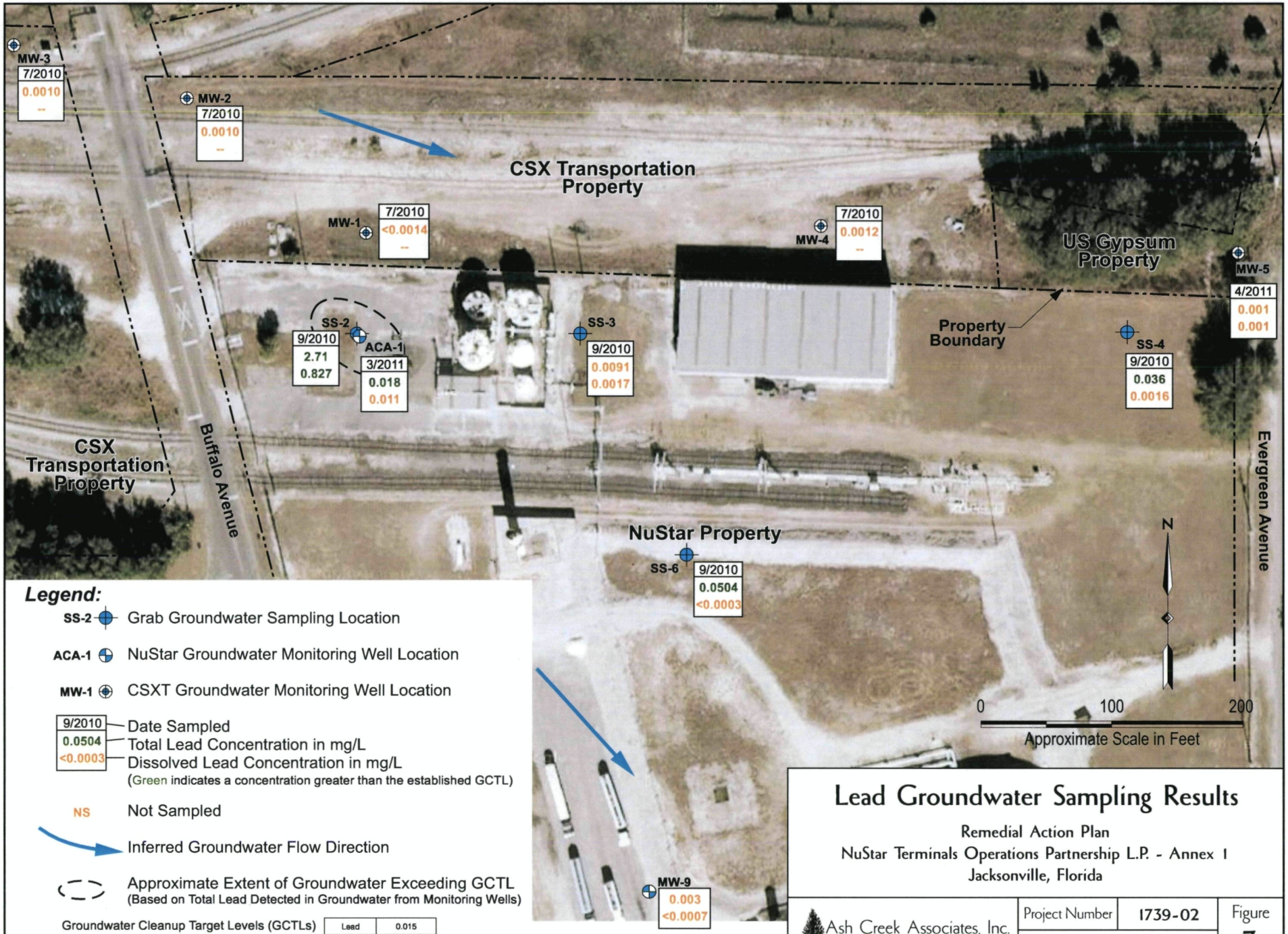
Remedial Action Plan
NuStar Terminals Operations Partnership L.P. - Annex 1
Jacksonville, Florida

Ash Creek Associates, Inc.
Environmental and Geotechnical Consultants

Project Number 1739-02

December 2011

Figure 6



Legend:

- SS-2 — Grab Groundwater Sampling Location
- ACA-1 — NuStar Groundwater Monitoring Well Location
- MW-1 — CSXT Groundwater Monitoring Well Location
- 9/2010 — Date Sampled
- 0.0504 — Total Lead Concentration in mg/L
- <0.0003 — Dissolved Lead Concentration in mg/L
  (Green indicates a concentration greater than the established GCTL)
- NS — Not Sampled
- Inferred Groundwater Flow Direction
- Approximate Extent of Groundwater Exceeding GCTL
  (Based on Total Lead Detected in Groundwater from Monitoring Wells)

Groundwater Cleanup Target Levels (GCTLs) | Lead | 0.015 |

NOTE: Base map prepared from 2010 - Google Imagery. Aerial dated December 31, 2007.

Lead Groundwater Sampling Results

Remedial Action Plan
NuStar Terminals Operations Partnership L.P. - Annex 1
Jacksonville, Florida

Ash Creek Associates, Inc.
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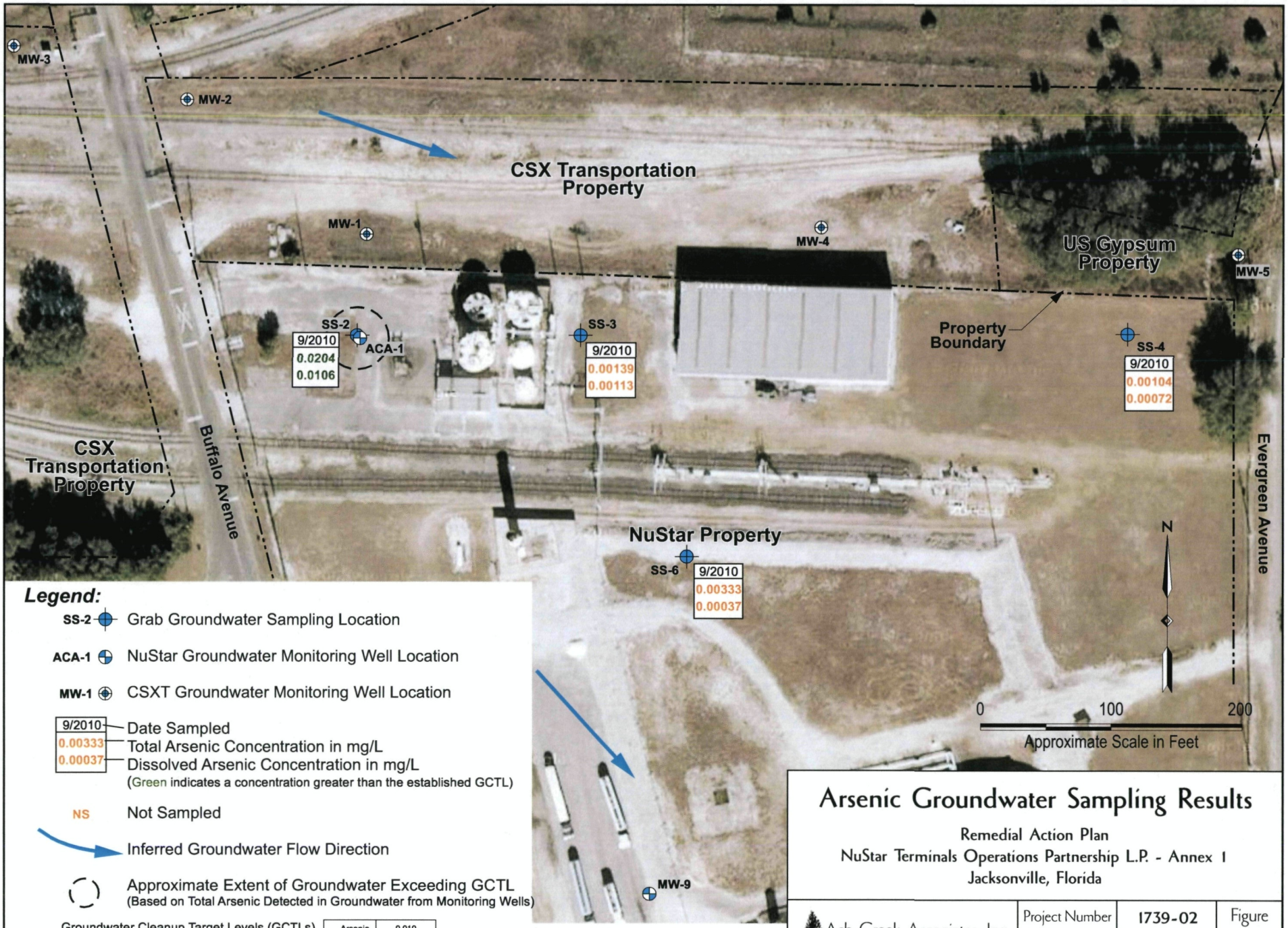
Project Number	1739-02	Figure 7
December 2011		



Arsenic Groundwater Sampling Results

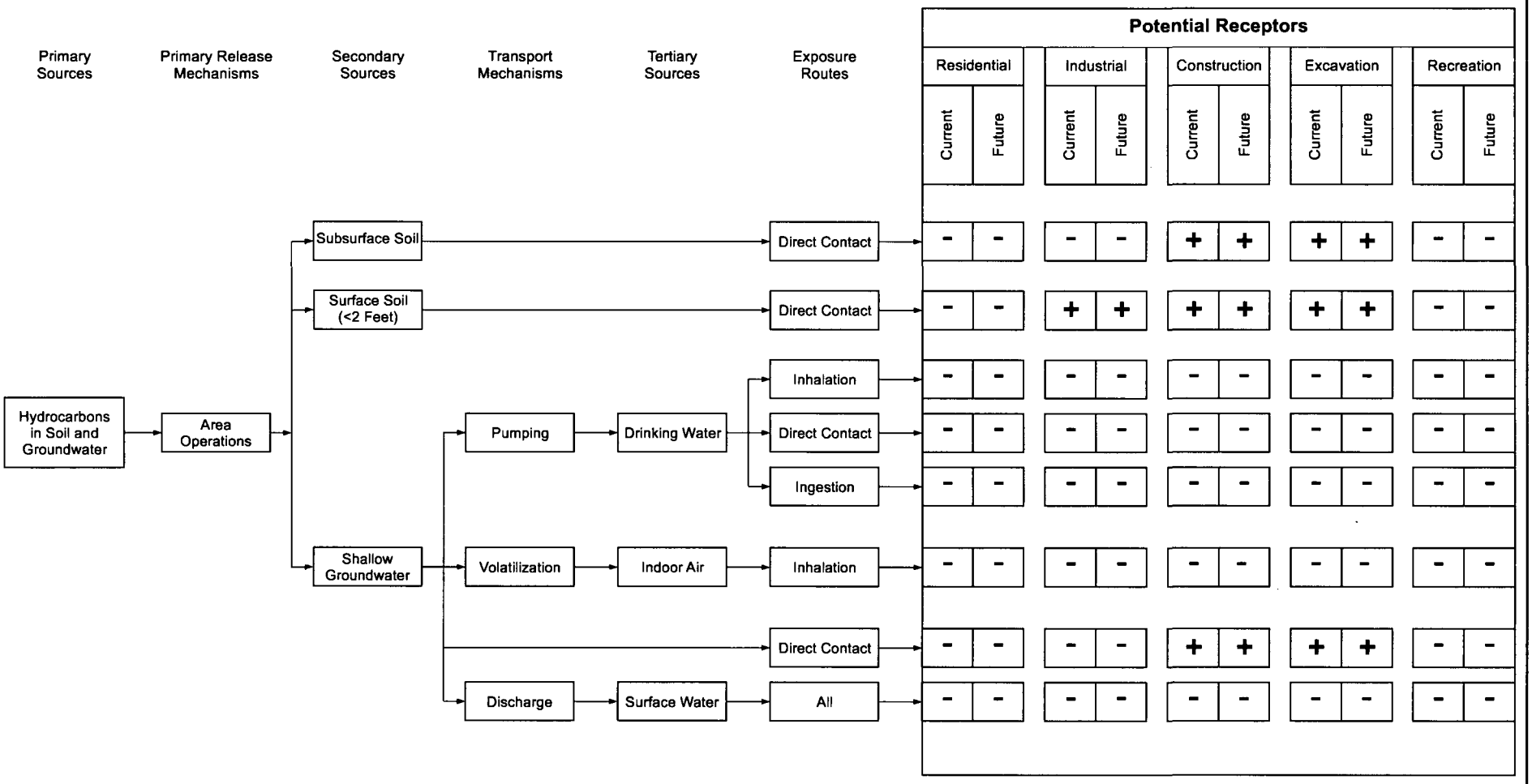
Remedial Action Plan
NuStar Terminals Operations Partnership L.P. - Annex 1
Jacksonville, Florida

Ash Creek Associates, Inc.
Environmental and Geotechnical Consultants

Project Number 1739-02

December 2011

Figure 8



Legend:

\+ Primary Exposure Route

\- No Exposure Via This Route

Conceptual Site Model

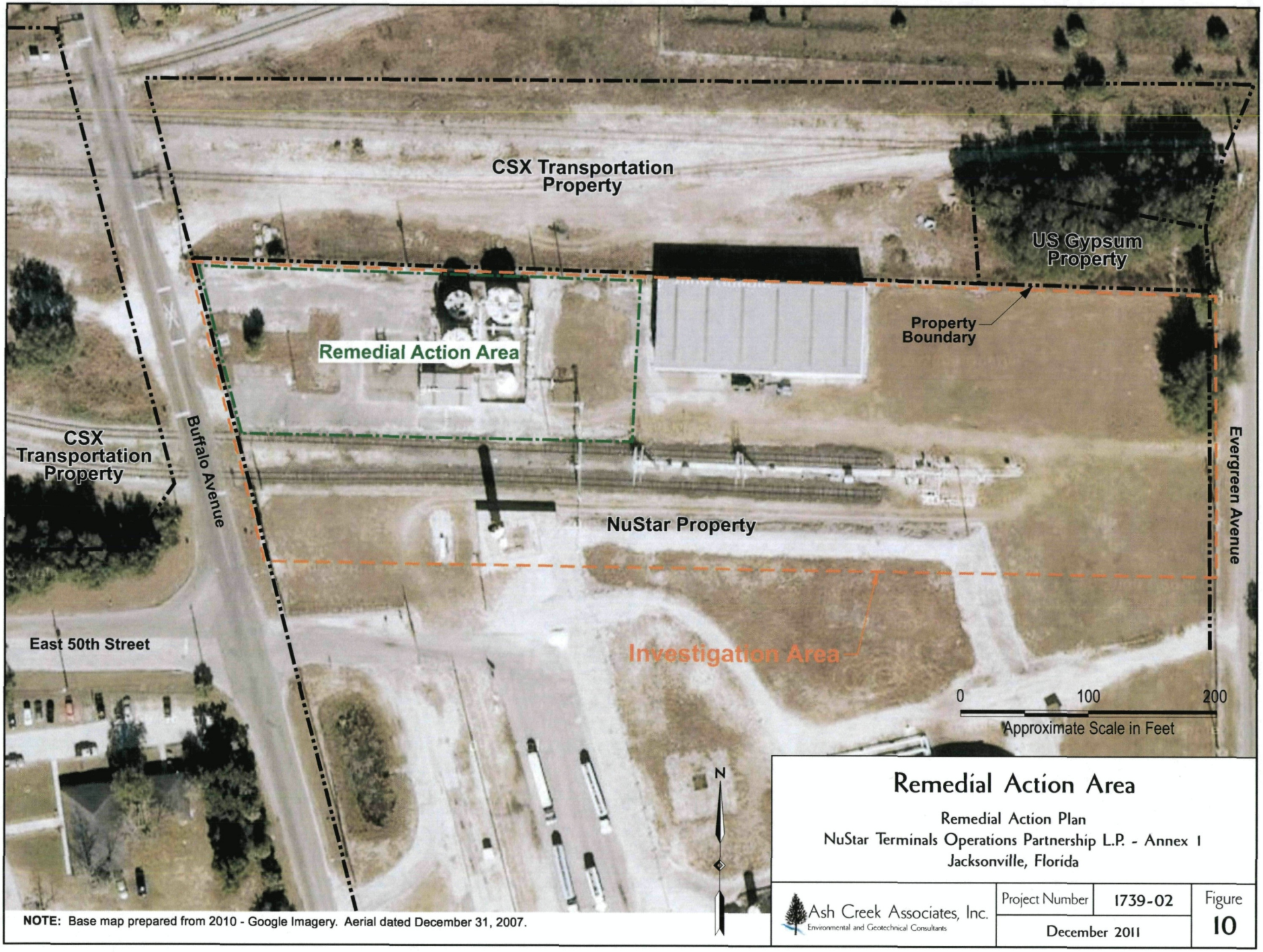
Remedial Action Plan
NuStar Terminals Operations Partnership L.P. - Annex I
Jacksonville, Florida

Ash Creek Associates, Inc.
Environmental and Geotechnical Consultants

Project Number 1739-02

December 2011

Figure 9



NOTE: Base map prepared from 2010 - Google Imagery. Aerial dated December 31, 2007.

Remedial Action Area

Remedial Action Plan
NuStar Terminals Operations Partnership L.P. - Annex 1
Jacksonville, Florida

Ash Creek Associates, Inc.
Environmental and Geotechnical Consultants

Project Number	1739-02	Figure
December 2011		10

Appendix A

Appendix A

Historical Sampling Results

Table A-1: Historical Soil Sampling Results - NuStar Property
NuStar Terminals Operations Partnership L.P. Jacksonville Annex I Facility
Jacksonville, Florida

Sample ID	BUF-16-SS	BUF-17-SS	BUF-18-SS	BUF-19-SS	BUF-20-SS	Florida Target Soil Cleanup Levels	
						Direct Exposure	
Sample Depth (feet bgs)	0.33	0.33	0.33	0.33	0.33	Residential	Industrial
Metals	Concentrations in mg/kg (ppm)						
Arsenic	0.68 J	--	**4.5 J**	**3.2 J**	**2.7 J**	2.1	12
Barium	6.9 J	7.5 J	7.1 J	11 J	11 J	120	130,000
Cadmium	0.06 J	0.09 J	0.10 J	0.19 J	0.15 J	82	1,700
Chromium	3.0 J	2.6 J	2.7 J	4.0 J	4.0 J	210	470
Cobalt	0.15 J	0.21 J	0.23 J	0.32 J	0.45 J	1,700	42,000
Copper	2.0 J	1.9 J	2.6 J	13 J	9.0 J	150	89,000
Lead	120 J	98 J	160 J	**2,000 J**	260 J	400	1,400
Antimony	--	--	0.76 R	**69 J**	1.8 J	27	370
Vanadium	3.0 J	3.9 J	3.9 J	5.8 J	7.9 J	67	10,000
Zinc	14 J	23 J	23 J	45 J	33 J	26,000	630,000
Aluminum	1,900 J	2,500 J	2,100 J	2,700 J	2,100 J	80,000	NA
Manganese	7.9 J	10 J	12 J	14 J	21 J	3,500	43,000
Magnesium	120 J	110 J	400 J	280 J	330 J	--	--
Iron	900	1,000	1,200	1,400	1,700	53,000	NA

Please refer to notes at end of table.

Table A-1: Historical Soil Sampling Results - NuStar Property
NuStar Terminals Operations Partnership L.P. Jacksonville Annex I Facility
Jacksonville, Florida

Sample ID	BUF-16-SS	BUF-17-SS	BUF-18-SS	BUF-19-SS	BUF-20-SS	Florida Target Soil Cleanup Levels	
						Direct Exposure	
Sample Depth (feet bgs)	0.33	0.33	0.33	0.33	0.33	Residential	Industrial
Semi-Volatiles	Concentrations in ug/kg (ppb)						
1,1-Biphenyl	--	--	--	54 J	--	3,000,000	34,000,000
2-Methylnaphthalene	--	--	--	450	71 J	210,000	2,100,000
Naphthalene	--	--	--	190 J	--	55,000	300,000
Phenanthrene	91 J	--	--	87 J	60 J	2,200,000	36,000,000
Fluoranthene	230 J	75 J	68 J	88 J	130 J	3,200,000	59,000,000
Pyrene	190 J	68 J	84 J	91 J	170 J	2,400,000	45,000,000
Benzo(a)Anthracene	110 J	41 J	48 J	58 J	110 J	*	*
Chrysene	120 J	48 J	62 J	86 J	160 J	*	*
Benzo(b)Fluoranthene	98 J	52 J	64 J	80 J	200 J	*	*
Benzo(k)Fluoranthene	100 J	40 J	55 J	70 J	150 J	*	*
Benzo(a)pyrene	**110 J**	51 J	51 J	78 J	**130 J**	100	700
Indeno(1,2,3-cd)Pyrene	74 J	--	--	49 J	93 J	*	*
Benzo(ghi)Perylene	44 J	--	--	43 J	52 J	2,500,000	52,000,000
Benzo(a)pyrene Equivalents*	**139.3**	60.7	62.8	97.5	**172.0**	100*	700*
PCBs	Concentrations in ug/kg (ppb)						
Aroclor 1260	--	--	--	120	--	500	2,600

Notes:

1. mg/kg (ppm) = Milligrams per kilogram (parts per million).
2. ug/kg (ppb) = Micrograms per kilogram (parts per billion).
3. * = Site concentrations for carcinogenic polycylic aromatic hydrocarbons must be converted to Benzo(a)pyrene equivalents before comparison with the appropriate direct exposure SCTL for Benzo(a)pyrene using the approach described in the February 2005 "Final Technical Report: Development of Clenaup Target Levels (CTLs) for Chapter 52-777, F.A.C."
4. -- = Not analyzed or Screening Level not available.
5. **Bolded** values indicate detected concentrations higher than at least one screening level value.
6. J = Estimated value.
7. R = Data rejected.
8. NA = Not available. Contaminant is not a health concern for this exposure scenario.

Appendix B

Appendix B

CSXT Groundwater Data

BUFFALO AVE.

POND

CONOCO PHILLIPS PROPERTY

CSXT PROPERTY

CSXT PROPERTY

NUSTAR PROPERTY

50th STREET

EVERGREEN STREET

ASB-16	
1/27/11	
0-2'	
9.2	
3.2	
<0.0070	

ASB-31	
3/3/11	
0-2'	
21.4	
NS	
NS	

ASB-17	
1/27/11	
0-2'	
0.20 I	
NS	
NS	

ASB-18	
1/27/11	
0-2'	
<0.095	
NS	
NS	

ASB-19	
1/27/11	
0-2'	
0.94	
NS	
NS	

ASB-20	
1/27/11	
0-2'	
0.54	
NS	
NS	

ASB-15	
1/27/11	
0-2'	
<0.087	
1.7	
<0.0070	

ASB-30	
3/3/11	
0-2'	
65.7	
NS	
NS	

ASB-32	
3/3/11	
0-2'	
103	
NS	
NS	

ASB-3	
12/10/09	
0-1'	
31.4	
83.6	
0.118	

ASB-4	
12/10/09	
0-1'	
10.3	
7.0	
<0.017	

ASB-5	
12/10/09	
0-1'	
7.0	
7.2	
<0.017	

ASB-6	
12/10/09	
0-1'	
148	
262	
0.0692	

ASB-21	
1/27/11	
0-2'	
0.29 I	
NS	
NS	

ASB-22	
1/27/11	
0-2'	
0.23 I	
NS	
NS	

ASB-24	
3/3/11	
0-2'	
4.1	
NS	
NS	

ASB-29	
3/3/11	
0-2'	
60.5	
NS	
NS	

ASB-1	
12/10/09	
0-1'	
98.8	
651	
1.97	

ASB-2	
12/10/09	
0-1'	
17.2	
4.6 I	
<0.017	

ASB-13	
1/27/11	
0-2'	
<0.11	
NS	
<0.0085	

ASB-28	
3/3/11	
0-2'	
15.4	
NS	
NS	

ASB-27	
3/3/11	
0-2'	
127	
NS	
NS	

SS-1	
9/9/10	
0.5-1'	
4.3	
16,000	
0.12	

SS-2	
9/9/10	
0.5-1'	
2.9	
190	
0.025	

ASB-7	
12/10/09	
0-1'	
7.0	
406	
0.113	

ASB-8	
12/10/09	
0-1'	
4.2	
1090	
0.0592	

ASB-9	
12/10/09	
0-1'	
2.7	
234	
0.372	

ASB-10	
12/10/09	
0-1'	
9.4	
82.0	
0.0321	

ASB-11	
12/10/09	
0-1'	
39.6	
241	
0.0722	

SS-9	
3/29/11	
0.5-1'	
1.91	
13.6	
NS	

SS-4	
9/9/10	
0.5-1'	
1.3 I	
370	
<0.012	

ASB-23	
3/3/11	
0-2'	
0.96	
NS	
NS	

ASB-25	
3/3/11	
0-2'	
47.8	
NS	
NS	

ASB-12	
1/27/11	
0-2'	
0.91	
1.3	
<0.0086	

ASB-26	
3/3/11	
0-2'	
50.2	
NS	
NS	

ASB-14/14*	
1/27/11	
0-2'	
15.7	
8.3	
NS	

SS-5	
9/9/10	
0.5-1'	
1.1 I	
59	
0.037	

SS-3	
9/9/10	
0.5-1'	
7.9	
540	
0.051	

SS-6	
9/9/10	
0.5-1'	
0.7 I	
30	
0.028	

SS-8	
3/29/11	
0.5-1'	
2.43	
7.02	
NS	

SS-7	
9/9/10	
0.5-1'	
0.8 I	
33	
0.036	

ASB-15 ASB-16 ASB-30 ASB-31 ASB-32 ASB-17 ASB-18 ASB-19 ASB-20 ASB-21 ASB-22 ASB-1 ASB-2 ASB-3 ASB-4 ASB-5 ASB-6 ASB-29 ASB-24 ASB-7 ASB-8 ASB-9 ASB-10 ASB-11 ASB-23 ASB-13 ASB-28 ASB-14 ASB-27 ASB-26 ASB-25 SS-1 SS-2 SS-3 SS-4 SS-9 SS-8 SS-6 SS-7 ASB-12 SS-5

N

0 100'
SCALE IN FEET

REFERENCE: LABINS - FLORIDA, TROUT RIVER/JACKSONVILLE - MrSID (2004).

LEGEND

- Surface Soil Boring (ASB-ARCADIS)
- Surface Soil Boring (NuStar)

SAMPLE ID			
DATE			
DEPTH			
CONSTITUENT	RESIDENTIAL	INDUSTRIAL	LEACHABILITY
ARSENIC	2.1	12	**
LEAD	400	1,400	**
BENZO(a) PYRENE	0.1	0.7	8

All concentrations in milligrams per kilogram (mg/kg)
BOLD Indicates constituent exceeds Florida Department of Environmental Protection, Soil Cleanup Target Level (FDEP SCTL) per chapter 62-777, FAC.
I - The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
** - Leachability values may be derived using SPLP test to calculate Site-Specific SCTLs
NS- Sample not collected
"Clean Sample" Location
Arsenic (2.1 mg/kg)
Lead (400 mg/kg)
Benzo(a)Pyrene (0.1 mg/kg)

CSX TRANSPORTATION, INC.
FLORIDA SMELTING
JACKSONVILLE, FLORIDA

DISTRIBUTION OF CONSTITUENTS IN THE SURFACE SOIL

ARCADIS

FIGURE 5

BUFFALO AVE.

POND

CONOCO PHILLIPS PROPERTY

CSXT PROPERTY

CSXT PROPERTY

NUSTAR PROPERTY

BUILDING

50th STREET

EVERGREEN STREET

ASB-16
1/27/11
2'-3'
12.9
NS
<0.0071

ASB-31
3/3/11
2'-3'
30.7
NS
NS

ASB-17
1/27/11
2'-3'
0.36 I
NS
NS

ASB-18
1/27/11
2'-3'
0.18 I
NS
NS

ASB-19
1/27/11
2'-3'
0.17 I
NS
NS

ASB-20
1/27/11
2'-3'
0.57
NS
NS

ASB-30
3/3/11
2'-3'
7.2
NS
NS

ASB-32
3/3/11
2'-3'
36.1
NS
NS

ASSB-3
12/10/09
2-3'
10.6
18.8
0.0179 I

ASSB-4
12/10/09
2-3'
13.3
13.2
0.0920

ASSB-5
12/10/09
2-3'
17.3
11.5
0.0338

ASSB-6
12/10/09
2-3'
15.5
6.6
0.0290 I

ASB-21
1/27/11
2'-3'
0.50
NS
NS

ASB-22
1/27/11
2'-3'
0.50
NS
NS

ASB-15
1/27/11
2'-3'
0.15 I
NS
NS

ASB-29
3/3/11
2'-3'
21.9
NS
NS

ASB-24
3/3/11
2'-3'
4.8
NS
NS

ASSB-1
12/10/09
2-3'
108
250
0.492

ASSB-2
12/10/09
2-3'
14.1
3.9 I
<0.015

1*
9/30/05
2-3'
0.03
2.5
NS

ASB-28
3/3/11
2'-3'
2.5
NS
NS

ASB-27
3/3/11
2'-3'
13.3
NS
NS

ASB-14
1/27/11
2'-3'
12.3
NS
NS

ASB-26
3/3/11
2'-3'
16.1
NS
NS

SS-1
9/9/10
2-2.5'
1.6 I
120
0.0086

SS-2
9/9/10
2-2.5'
16
16,000
NS

ASSB-7
12/10/09
2-3'
6.4
357
0.129

ASSB-8
12/10/09
2-3'
3.1
502
0.0418

SS-3
9/9/10
2-2.5'
3.8
3,400
NS

ASSB-9
12/10/09
2-3'
9.1
663
0.320

ASSB-10
12/10/09
2-3'
28.0
54.4
0.127

ASSB-11
12/10/09
2-3'
25.2
31.9
0.0861

SS-4
9/9/10
2-2.5'
1.1 I
86
NS

ASB-23
3/3/11
2'-3'
0.29 I
NS
NS

ASB-25
3/3/11
2'-3'
37.5
NS
NS

SS-5
9/9/10
2-2.5'
0.9 I
3.1
NS

SS-6
9/9/10
2-2.5'
0.8 I
2.4
NS

SS-7
9/9/10
2-2.5'
1.1 I
5.9
NS

REFERENCE: LABINS - FLORIDA, TROUT RIVER/JACKSONVILLE - MrSID (2004).

LEGEND

- Arcadis Subsurface Soil Boring (ASSB-Arcadis)
- USEPA Subsurface Soil Boring
- Surface Soil Boring (NuStar)

SAMPLE ID			
DATE			
DEPTH			
CONSTITUENT	RESIDENTIAL	INDUSTRIAL	LEACHABILITY
ARSENIC	2.1	12	**
LEAD	400	1,400	**
BENZO(a) PYRENE	0.1	0.7	8

All concentrations in milligrams per kilogram (mg/kg)
BOLD Indicates constituent exceeds Florida Department of Environmental Protection, Soil Cleanup Target Level (FDEP SCTL) per chapter 62-777, FAC.
I - The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
** - Leachability values may be derived using SPLP test to calculate Site-Specific SCTLs
NS- Sample not collected
* - Historic EPA soil sample location
"Clean Sample" Location

- Arsenic (2.1 mg/kg)
- Lead (400 mg/kg)
- Benzo(a)Pyrene (0.1 mg/kg)

N

0 100'
SCALE IN FEET

CSX TRANSPORTATION, INC.
FLORIDA SMELTING
JACKSONVILLE, FLORIDA

DISTRIBUTION OF CONSTITUENTS IN THE SUB-SURFACE SOIL

ARCADIS

FIGURE 7

MW-3
F75346-4
7/22/2010
<0.048
<2.0
1.0 I

MW-2	
F74666-2	F75346-1
6/24/10	7/22/2010
<0.049	<0.048
86.1	**139.0**
<1.0	<1.0

MW-4
F75346-3
7/22/2010
<0.048
23.3
1.2 I

MW-5 *
4/6/11
NA
NA
1 I

MW-5	
F79677-1	F80481-1
1/28/2011	3/2/2011
NA	NA
<2.0	4.0 I
NA	NA

ACA-1 *
3/30/11
NA
NA
18

MW-1	
F74666-1	F75346-2
6/24/10	7/22/10
<0.049	<0.049
15.6	**48.9**
<1.0	1.4 I

MW-9 *
4/2/11
NA
NA
3 I

SITE LOCATION

MW1 MW2 MW3 MW4 MW5 MW9

SS-2 SS-3 SS-4 SS-6 ACA-1

Building

Buffalo Ave

50th St

Evergreen Ave

LEGEND:

- MONITOR WELL LOCATIONS
- NUSTAR GROUNDWATER SAMPLE LOCATION
- NUSTAR MONITOR WELL LOCATION
- ARSENIC DISTRIBUTION
- LEAD DISTRIBUTION
- RAIL
- ROADS

SAMPLE ID	
LAB ID	
DATE	
CONSTITUENTS	GCTLs
BENZO(A)PYRENE	0.2
ARSENIC	10
LEAD	15

0 150 300 Feet

GRAPHIC SCALE

*ANALYTICAL DATA COLLECTED BY ASH CREEK ASSOCIATES
NUSTAR GRAB GROUNDWATER SAMPLES WERE NOT USED IN THE DISTRIBUTION CONTOURS OF GROUNDWATER
BOLD - INDICATES CONSTITUENT EXCEEDS FDEP GCTL
FDEP GCTL - FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION GROUNDWATER CLEANUP TARGET LEVEL PER CHAPTER 62-777, FLORIDA ADMINISTRATIVE CODE (FAC).
USEPA - UNITED STATES ENVIRONMENTAL PROTECTION AGENCY.
NA - NOT ANALYZED
I - THE REPORTED VALUE IS BETWEEN THE LABORATORY METHOD DETECTION LIMIT AND THE LABORATORY PRACTICAL QUANTITATION LIMIT
ALL RESULTS REPORTED IN µg/L (MICROGRAMS PER LITER)

CSX TRANSPORTATION, INC.
FLORIDA SMELTING
JACKSONVILLE, FLORIDA

DISTRIBUTION OF CONSTITUENTS IN GROUNDWATER

ARCADIS

FIGURE 10

CITY: MPLS DIV/GROUP: IM DB: MG LD: JD
FL SMELTING
G:\GIS\Projects\FL_Smelting\ArcMap\2011\GW Dist. 20110503.mxd - 5/6/2011 @ 12:48:37 PM

TABLE 1
SUMMARY OF SOIL ANALYTICAL RESULTS
Florida Smelting Company
Jacksonville, Duval County FL

Analytes (US EPA Method), Units	FDEP SCTLs (ppm)			FDEP GCTLs (ppm)	Sample ID: / Laboratory ID: / Sample Depth (ft bls): / Sample Date:									
	Residential	Industrial	Leachability		ASB-1 (0-1') F70132-11 0-1' 12/10/09	ASSB-1 (2-3') F70132-12 2-3' 12/10/09	ASB-2 (0-1') F70132-13 0-1' 12/10/09	ASSB-2 (2-3') F70132-14 2-3' 12/10/09	ASB-3 (0-1') F70132-15 0-1' 12/10/09	ASSB-3 (2-3') F70132-16 2-3' 12/10/09	ASB-4 (0-1') F70132-17 0-1' 12/10/09	ASSB-4 (2-3') F70132-18 2-3' 12/10/09	ASB-5 (0-1') F70132-19 0-1' 12/10/09	ASSB-5 (2-3') F70132-20 2-3' 12/10/09
Polynuclear Aromatics (8270C), mg/kg														
Benzo(a)Pyrene	0.1	0.7	8	na	**1.97**	**0.492**	<0.017	<0.015	0.118	0.0179 I	<0.017	0.0920	<0.017	0.0338
Metals (SW846 6010B), mg/kg														
Arsenic	2.1	12	--	na	**98.8**	**108**	**17.2**	**14.1**	**31.4**	**10.6**	**10.3**	**13.3**	**7.0**	**17.3**
Lead	400	1,400	--	na	**651**	250	4.6 I	3.9 I	83.6	18.8	7.0	13.2	7.2	11.5
Metals (SPLP), mg/L														
Arsenic	NA	NA	NA	0.010	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

Footnotes on Page 6

TABLE 1
SUMMARY OF SOIL ANALYTICAL RESULTS
Florida Smelting Company
Jacksonville, Duval County FL

Analytes (US EPA Method), Units	FDEP SCTLs (ppm)			FDEP GCTLs (ppm)	Sample ID:	ASB-6 (0-1')	ASSB-6 (2-3')	ASB-7 (0-1')	ASSB-7 (2-3')	ASB-8 (0-1')	ASSB-8 (2-3')	ASB-9 (0-1')	ASSB-9 (2-3')	ASB-10 (0-1')	ASSB-10 (2-3')	ASB-11 (0-1')
					Laboratory ID:	F70132-21	F70132-22	F70132-1	F70132-2	F70132-3	F70132-4	F70132-5	F70132-6	F70132-7	F70132-8	F70132-9
					Sample Depth (ft bls):	0-1'	2-3'	0-1'	2-3'	0-1'	2-3'	0-1'	2-3'	0-1'	2-3'	0-1'
					Sample Date:	12/10/09	12/10/09	12/10/09	12/10/09	12/10/09	12/10/09	12/10/09	12/10/09	12/10/09	12/10/09	12/10/09
	Residential	Industrial	Leachability													
Polynuclear Aromatics (8270C), mg/kg																
Benzo(a)Pyrene	0.1	0.7	8	na		0.0692	0.0290 I	0.113	0.129	0.0592	0.0418	**0.372**	**0.320**	0.0321	0.127	0.0722
Metals (SW846 6010B), mg/kg																
Arsenic	2.1	12	--	na		**148**	**15.5**	**7.0**	**6.4**	**4.2**	**3.1**	**2.7**	**9.1**	**9.4**	**28.0**	**39.6**
Lead	400	1,400	--	na		262	6.6	**406**	357	**1,090**	**502**	234	**663**	82.0	54.4	241
Metals (SPLP), mg/L																
Arsenic	NA	NA	NA	0.010		NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

Footnotes on Page 6

TABLE 1
SUMMARY OF SOIL ANALYTICAL RESULTS
Florida Smelting Company
Jacksonville, Duval County FL

Analytes (US EPA Method), Units	FDEP SCTLs (ppm)			FDEP GCTLs (ppm)	Sample ID: / Laboratory ID: / Sample Depth (ft bls): / Sample Date:										
	Residential	Industrial	Leachability		ASSB-11 (2-3') F70132-10 2-3' 12/10/09	ASB-12 (0-2) F79692-19 0-2' 1/27/11	ASB-13 (0-2) F79692-20 0-2' 1/27/11	ASB-14 (0-2) F79692-17 0-2' 1/27/11	ASB-14 (2-3) F79692-18 2-3' 1/27/11	ASB-15 (0-2) F79692-15 0-2' 1/27/11	ASB-15 (2-3) F79692-16 2-3' 1/27/11	ASB-16 (0-2) F79692-13 0-2' 1/27/11	ASB-16 (2-3) F79692-14 2-3' 1/27/11	ASB-17 (0-2) F79692-11 0-2' 1/27/11	ASB-17 (2-3) F79692-12 2-3' 1/27/11
Polynuclear Aromatics (8270C), mg/kg															
Benzo(a)Pyrene	0.1	0.7	8	na	0.0861	<0.0086	<0.0085	NS	NS	<0.0070	<0.0083	<0.0070	<0.0071	NS	NS
Metals (SW846 6010B), mg/kg															
Arsenic	2.1	12	--	na	**25.2**	0.91	<0.11	**15.7**	**12.3**	<0.087	0.15 I	**9.2**	**12.9**	0.20 I	0.36 I
Lead	400	1,400	--	na	31.9	1.3	NS	8.3	NS	1.7	NS	3.2	NS	NS	NS
Metals (SPLP), mg/L															
Arsenic	NA	NA	NA	0.010	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

Footnotes on Page 6

TABLE 1
SUMMARY OF SOIL ANALYTICAL RESULTS
Florida Smelting Company
Jacksonville, Duval County FL

Analytes (US EPA Method), Units	FDEP SCTLs (ppm)			FDEP GCTLs (ppm)	Sample ID:	ASB-18 (0-2)	ASB-18 (2-3)	ASB-19 (0-2)	ASB-19 (2-3)	ASB-20 (0-2)	ASB-20 (2-3)	ASB-21 (0-2)	ASB-21 (2-3)	ASB-22 (0-2)	ASB-22 (2-3)	ASB-23 (0-2)
					Laboratory ID:	F79692-9	F79692-10	F79692-7	F79692-8	F79692-5	F79692-6	F79692-3	F79692-4	F79692-1	F79692-2	F80480-20
					Sample Depth (ft bls):	0-2'	2-3'	0-2'	2-3'	0-2	2-3	0-2'	2-3'	0-2'	2-3'	0-2'
					Sample Date:	1/27/11	1/27/11	1/27/11	1/27/11	1/27/11	1/27/11	1/27/11	1/27/11	1/27/11	1/27/11	3/3/11
	Residential	Industrial	Leachability													
Polynuclear Aromatics (8270C), mg/kg																
Benzo(a)Pyrene	0.1	0.7	8	na		NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Metals (SW846 6010B), mg/kg																
Arsenic	2.1	12	--	na		<0.095	0.18 I	0.94	0.17 I	0.54	0.57	0.29 I	<0.11	0.23 I	0.50	0.96
Lead	400	1,400	--	na		NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Metals (SPLP), mg/L																
Arsenic	NA	NA	NA	0.010		NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

Footnotes on Page 6

TABLE 1
SUMMARY OF SOIL ANALYTICAL RESULTS
Florida Smelting Company
Jacksonville, Duval County FL

Analytes (US EPA Method), Units	FDEP SCTLs (ppm)			FDEP GCTLs (ppm)	Sample ID:	ASB-23 (2-3)	ASB-24 (0-2)	ASB-24 (2-3)	ASB-25 (0-2)	ASB-25 (2-3)	ASB-26 (0-2)	ASB-26 (2-3)	ASB-27 (0-2)	ASB-27 (2-3)	ASB-28 (0-2)	ASB-28 (2-3)
					Laboratory ID:	F80480-19	F80480-17	F80480-18 / F80480-18R	F80480-11 / F80480-11R	F80480-12	F80480-9	F80480-10	F80480-15 / F80480-15R	F80480-16	F80480-13	F80480-14
					Sample Depth (ft bls):	2-3'	0-2'	2-3'	0-2'	2-3'	0-2'	2-3'	0-2'	2-3	0-2'	2-3'
					Sample Date:	3/3/11	3/3/11	3/3/11	3/3/11	3/3/11	3/3/11	3/3/11	3/3/11	3/3/11	3/3/11	3/3/11
	Residential	Industrial	Leachability													
Polynuclear Aromatics (8270C), mg/kg																
Benzo(a)Pyrene	0.1	0.7	8	na		NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Metals (SW846 6010B), mg/kg																
Arsenic	2.1	12	--	na		0.29 I	4.1	4.8	47.8	37.5	50.2	16.1	127	13.3	15.4	2.5
Lead	400	1,400	--	na		NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Metals (SPLP), mg/L																
Arsenic	NA	NA	NA	0.010		NS	NS	0.017 I	0.050	NS	NS	NS	0.13	NS	NS	NS

Footnotes on Page 6

TABLE 1
SUMMARY OF SOIL ANALYTICAL RESULTS
Florida Smelting Company
Jacksonville, Duval County FL

Analytes (US EPA Method), Units	FDEP SCTLs (ppm)			FDEP GCTLs (ppm)	Sample ID: / Laboratory ID: / Sample Depth (ft bls): / Sample Date:							
	Residential	Industrial	Leachability		ASB-29 (0-2) F80480-1 / F80480-1R 0-2' 3/3/11	ASB-29 (2-3) F80480-2 2-3' 3/3/11	ASB-30 (0-2) F80480-5 / F80480-5R 0-2' 3/3/11	ASB-30 (2-3) F80480-6 2-3' 3/3/11	ASB-31 (0-2) F80480-7 0-2' 3/3/11	ASB-31 (2-3) F80480-8 2-3' 3/3/11	ASB-32 (0-2) F80480-3 0-2' 3/3/11	ASB-32 (2-3) F80480-4 2-3' 3/3/11
Polynuclear Aromatics (8270C), mg/kg												
Benzo(a)Pyrene	0.1	0.7	8	na	NS	NS	NS	NS	NS	NS	NS	NS
Metals (SW846 6010B), mg/kg												
Arsenic	2.1	12	--	na	60.5	21.9	65.7	7.2	21.4	30.7	103	36.1
Lead	400	1,400	--	na	NS	NS	NS	NS	NS	NS	NS	NS
Metals (SPLP), mg/L												
Arsenic	NA	NA	NA	0.010	0.084	NS	0.10	NS	NS	NS	NS	NS

Footnotes:

FDEP SCTL - Florida Department of Environmental Protection Soil Cleanup target Level per Chapter 62-777, Florida Administrative Code (F.A.C.)

FDEP GCTL - Florida Department of Environmental Protection Groundwater Cleanup target Level per Chapter 62-777, Florida Administrative Code (F.A.C.)

USEPA - United States Environmental Protection Agency

ppm - parts per million

ft bls - feet below land surface

mg/kg - milligrams per kilogram

mg/L - milligrams per liter

I - The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit

-- Leachability values may be derived using SPLP test to calculate Site-Specific SCTLs

NS - Not Sampled

NA - Not applicable

TABLE 2
Water-Level Elevations
Florida Smelting Company
Jacksonville, Duval County Florida

Well ID	Date	Well Diameter (inches)	Well Depth (ft bls)	Well Screen Interval (ft bls)	Relative Casing Elevation (ft)[1]	Depth to Water (ft bls)	Relative Water Elevation (ft)
MW-1	6/24/2010	2	11.96	2-12	15.13	6.80	8.33
	7/22/2010					6.41	8.72
	3/2/2011				12.41	5.71	6.70
MW-2	6/24/2010	2	11.91	2-12	18.18	9.57	8.61
	7/22/2010					9.18	9.00
	3/2/2011				15.49	8.32	7.17
MW-3	7/22/2010	2	14.77	5-15	20.00	10.77	9.23
	3/2/2011				17.32	9.90	7.42
MW-4	7/22/2010	2	11.97	2-12	12.79	4.86	7.93
	3/2/2011				10.11	4.21	5.90
MW-5	1/28/2011	2	12.01	2-12	7.28	2.62	4.66
	3/2/2011					2.53	4.75

ft - feet
bls - below land surface
NC - Not calculated
[1] - Elevations Surveyed on to Arbitrary Bechmark Elevation of 20.00 ft above mean sea level on June and July 2010.
Elevations were resuveryed in February 2011 on the NAVD 1988

TABLE 3
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS
Florida Smelting Company
Jacksonville, Duval County FL

Analytes (USEPA Method), Units	Sample ID: / Laboratory ID: / Sample Date:	MW-1 F74666-1 6/24/10	MW-1 F75346-2 7/22/10	MW-2 F74666-2 6/24/10	MW-2 F75346-1 7/22/2010	MW-3 F75346-4 7/22/2010	MW-4 F75346-3 7/22/2010	MW-5 F79677-1 1/28/2011	MW-5 F80481-1 3/2/2011
	FDEP GCTLs								
Polynuclear Aromatics (8270C), µg/L									
Benzo(a)Pyrene	0.2	<0.049	<0.049	<0.049	<0.048	<0.048	<0.048	NA	NA
Metals (SW846 6010B), µg/L									
Arsenic	10	**15.6**	**48.9**	**86.1**	**139**	<2.0	**23.3**	<2.0	4.0 I
Lead	15	<1.0	1.4 I	<1.0	<1.0	1.0 I	1.2 I	NA	NA

Footnotes:

BOLD - Concentration exceeds FDEP GCTL
FDEP GCTL - Florida Department of Environmental Protection Groundwater Cleanup Target Level per Chapter 62-777, Florida Adminstrative Code (F.A.C.)
I - The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit
NA - Not Anaylzed
USEPA - United States Envoronmental Protection Agency
µg/L - micrograms per liter

Appendix C

Appendix C

Remedial Action Plan Summary

Remedial Action Plan Summary

DEP Form # 62-780.900(4)
Form Title: Remedial Action Plan Summary
Effective Date: 4-17-05

Site Name: Florida Smelting Company / Buffalo Avenue DEP Site ID No COM-293[illegible]274
Location: 5800 Buffalo Avenue, Jacksonville, FLA Current Date: 10/12/11
CHECK ALL THAT APPLY: Date of Last GW Analysis: March 30, 2011

Media Contaminated: ☒ Groundwater ☐ Sediment ☒ Soil ☐ Air

Type(s) of Product(s) Discharged:
- ☐ Gasoline / Kerosene Analytical Group
- ☐ Listed Hazardous Waste
- ☒ Other types of contaminants (solvents, etc.)

List: Arsenic & lead

Plume Characteristics:
- Estimated Mass (lbs): ~~300~~ ~~350~~ ~~350~~ 1bs (PB)
  Groundwater _____ Soil _____
- Area of Plume 36000 (ft²)
- Depth of Plume 0.5 - 2.5 (ft)

Groundwater Recovery and Specifications:
- No. of Recovery Wells _____
  ☐ Vertical ☐ Horizontal
- Design Flow Rate/Well _____ (gpm)
- Total Flow Rate _____ (gpm)
- Hydraulic Conductivity _____ (ft/day)
- Recovery Well Screen Interval _____ (ft)
- Depth to Water _____ (ft)

Method of Groundwater Remediation:
- ☐ Pump-and-Treat:
  - ☐ Air Stripper
    - ☐ Low Profile ☐ Packed Tower
  - ☐ Diffused Aerator
  - ☐ Activated Carbon
    - ☐ Primary Treatment ☐ Polishing
- ☐ In Situ Air Sparging - Pressure: _____ (psi)
  - No. of Sparge Points _____
    ☐ Vertical ☐ Horizontal
  - Design Air Flow Rate/Well _____ (cfm)
  - Total Air Flow Rate _____ (cfm)
- ☐ Biosparging:
  - No. of Sparge Points _____
    ☐ Vertical ☐ Horizontal
  - Design Air Flow Rate/Well _____ (cfm)
- ☐ Bioremediation:
  - ☐ In Situ ☐ Ex Situ
- ☒ Other Not applicable

Free Product Present: ☐ Yes ☒ No
- Estimated Volume _____ (gal)
- Maximum Thickness _____ (in)
- Method of Recovery _____

Method of Groundwater Disposal:
- ☐ Infiltration Gallery ☐ Sanitary Sewer
- ☐ Surface Discharge/NPDES ☐ Injection Well
- ☒ Other Not applicable

Method of Soil Remediation:
- ☐ Excavation:
  Volume to be excavated _____ (yds³)
  - ☐ Thermal Treatment ☐ Land Farming On Site
  - ☐ Landfill ☐ Bioremediation
  - ☒ ~~Other~~ Engineered cap
- ☐ Vapor Extraction System (VES):
  - No. of Venting Wells _____
    ☐ Vertical ☐ Horizontal
  - VES - Applied Vacuum _____ (wg)
  - Design Air Flow Rate _____ (cfm)
  - Design Radius of Influence _____ (ft)
  - Air Emissions Treatment
    - ☐ Thermal Oxidizer ☐ Catalytic Converter
    - ☐ Carbon ☐ Other _____
- ☐ Soil Bioventing:
  - No. of Venting Wells _____
    ☐ Vertical ☐ Horizontal
  - Design Air Flow Rate _____ (cfm)
- ☐ In Situ Bioremediation
- ☒ Other Engineered cap

Natural Attenuation:
- ☐ Groundwater ☐ Soil
- Method of Evaluation:
  - ☐ Historical Trends
  - ☐ Site-Specific Parameters:

Estimated Time of Cleanup: N/A (days)
- Method of Estimation:
  - ☐ Pore Volumes (no. of pore vols. = _)
  - ☐ Exponential Decay (Decay Rate) _____ (day⁻¹)
  - ☐ Groundwater Transport Model _____
  - ☐ Other _____

Ash Creek Associates, Inc.
Environmental and Geotechnical Consultants
3015 SW First Avenue
Portland, Oregon 97201-4707
(503) 924-4704 Portland
(360) 567-3977 Vancouver
(503) 943-6357 Fax
www.ashcreekassociates.com

TRANSMITTAL MEMORANDUM

Date: December 29, 2011	**Project Number:** 1739-01
Subject: Jacksonville FSC Remedial Action Plan	

To: Mr. John Phillips
Florida Department of Environmental Protection
Northeast District Office
7825 Baymeadows Way, Suite 200B
Jacksonville Florida 32256-7590

WE ARE SENDING YOU:	☒ Attached	or	☐ Under Separate Cover:
☒ Report	☐ Letter	☐ Plans	☐ Specifications
☐ Proposal	☐ Contract	☐ Samples	☐ Other

THESE ARE TRANSMITTED AS CHECKED BELOW:			
☐ As Requested	☒ For Your Use	☐ For Review and Comment	☐ For Approval

Copies	Date	Description
1	12/29/2011	Remedial Action Plan, Former Florida Smelting Company, FDEP Site # Com_293274, Project #315913, Jacksonville Annex I Bulk Terminal, Jacksonville, Florida

Remarks:

Enclosed, please find one copy of the above-referenced report. Please feel free to contact me if you have any questions. Thank you.

Amanda Spencer, R.G.
Principal Hydrogeologist

cc: Ms. Amanda Joyce, NuStar Energy L.P. (w/ enclosure — one copy)
Mr. Bill Bannister, NuStar Energy L.P. (w/ enclosure — one copy)
Mr. Joe Aldridge, NuStar Energy L.P. (electronic deliverable)